

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL
FOUNDED 1880



This burnished copper tower is on the roof of the Alhambra, Calif., depot of Transcontinental and Western Air. The walls and roof of the tower are 16-gauge copper, riveted to the structural frame. All exterior surfaces were burnished and polished by hand and then covered with one coat of lacquer. The installation was made by Emil Brown, Los Angeles sheet metal contractor

JUNE 8, 1931

IF IT'S GOOD ENOUGH FOR BUILDINGS LIKE THESE

There is no better way to demonstrate the supremacy of Toncan Iron for ventilating and heating ducts than by the high character of the buildings in which it has been used.

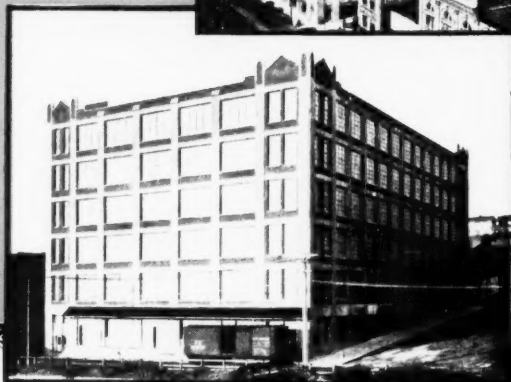
Contractors find this unusual alloy of refined iron, copper and molybdenum a distinct asset in holding old business and attracting new. Its extreme resistance to rust and corrosion has been made well known to users through powerful advertising. Its ability to last longer under severe conditions of weather, temperature and humidity has been borne out by actual service. And its workability, the ease with which it can be fabricated, makes it a real cost saver in the shop.

Write the words Toncan Iron into your bids. Attach literature which we will furnish, to your bid, to explain to your customers why Toncan Iron will serve longer and at lower ultimate cost. Bring in business from buyers who appreciate quality in even such an apparently simple thing as sheet metal. You know the difference in favor of Toncan as soon as you work with it. Tell your customers who look to you for advice—to your mutual profit.

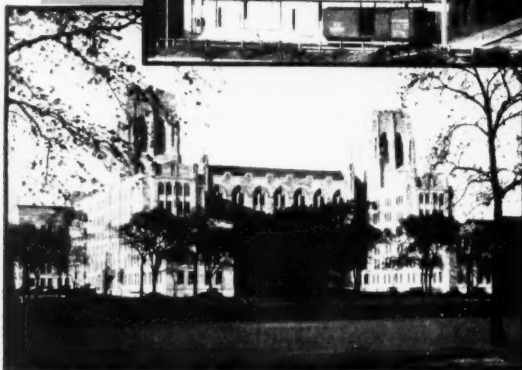


*The Townhouse,
Los Angeles, Cal.
Toncan Iron in
Ventilating System.*

*R. J. Reynolds Tobacco Co.
Gen'l Headquarters Bldg.
Winston-Salem, N. C.—
Toncan Iron in Ventilating
Systems—Shreve, Lamb &
Harmon, Architects. Riggs,
Distles and Co., Baltimore
Sheet Metal Contractor.*



*Cigar Factory of
P. Lorillard Co.,
Richmond, Va.
Toncan Iron
installed in Ven-
tilating System
by Richmond Air
Equipment Co.*



*Univ. of Chicago Medical Building. Toncan Iron in Ventilating System.
Coolidge and Hodgson, Architects, The Haines Co. Ventilating Cont.*



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GENERAL OFFICES: YOUNGSTOWN, OHIO





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CINCINNATI, OHIO

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True Talks

with successful sheet metal men

SERIES No. 1

NUMBER 3

TOLEDO FIRM CASHES IN ON MONEL METAL HOUSEHOLD EQUIPMENT

WARNKE BROS. building profitable business in table and cabinet tops, range hoods, etc. See bright prospects in domestic market.

Is there a good market for Monel Metal household equipment? Is it easy to sell? Is it profitable? Warnke Bros.' answer to all these questions is an emphatic "Yes"—and Warnke Bros. ought to know what they're talking about!

In fact, this fast-growing Toledo, Ohio, sheet metal firm is so optimistic about the future of Monel Metal in the home that it is making a special drive for this type of



F. L. WARNKE



EDWARD H. WARNKE

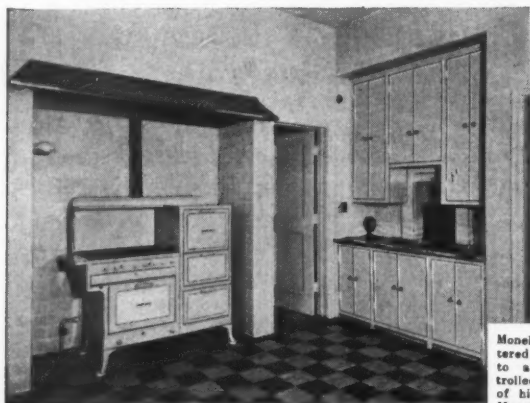
business. For the past two or three years Warnke Bros. have been devoting much time and energy to selling home owners the advantages of Monel Metal equipment. And results have been most gratifying. Today many Toledo kitchens shine with gleaming Monel Metal table tops, cabinet tops, range hoods and other modern units that reflect credit to the salesmanship and craftsmanship of Warnke Bros.

Warnke Bros. are thoroughly "sold" on the future of Monel Metal household equipment because their own broad experience has proved that, more and more, women are demanding the advantages that this modern metal offers. They say that Monel Metal's

modern beauty, rust-immunity, corrosion-resistance, cleanability, and steel-like durability are properties that never fail to appeal to their prospects. And if this concern's



Warnke Bros. fabricated this Monel Metal cabinet top for a modern Perrysburg, Ohio, home.



Type of cabinet top, range hood and vent pipe that shows a high grade Monel Metal job produced by Warnke Bros.

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

A HIGH NICKEL ALLOY

MONEL METAL

NICKEL ALLOYS LOOK BETTER LONGER



sales records are any criterion, that statement hits the nail squarely on the head!

Write for copy of interesting pamphlet "Good Business Waiting To Be Found" and learn how you can profit by the example of progressive sheet metal "merchandizers."

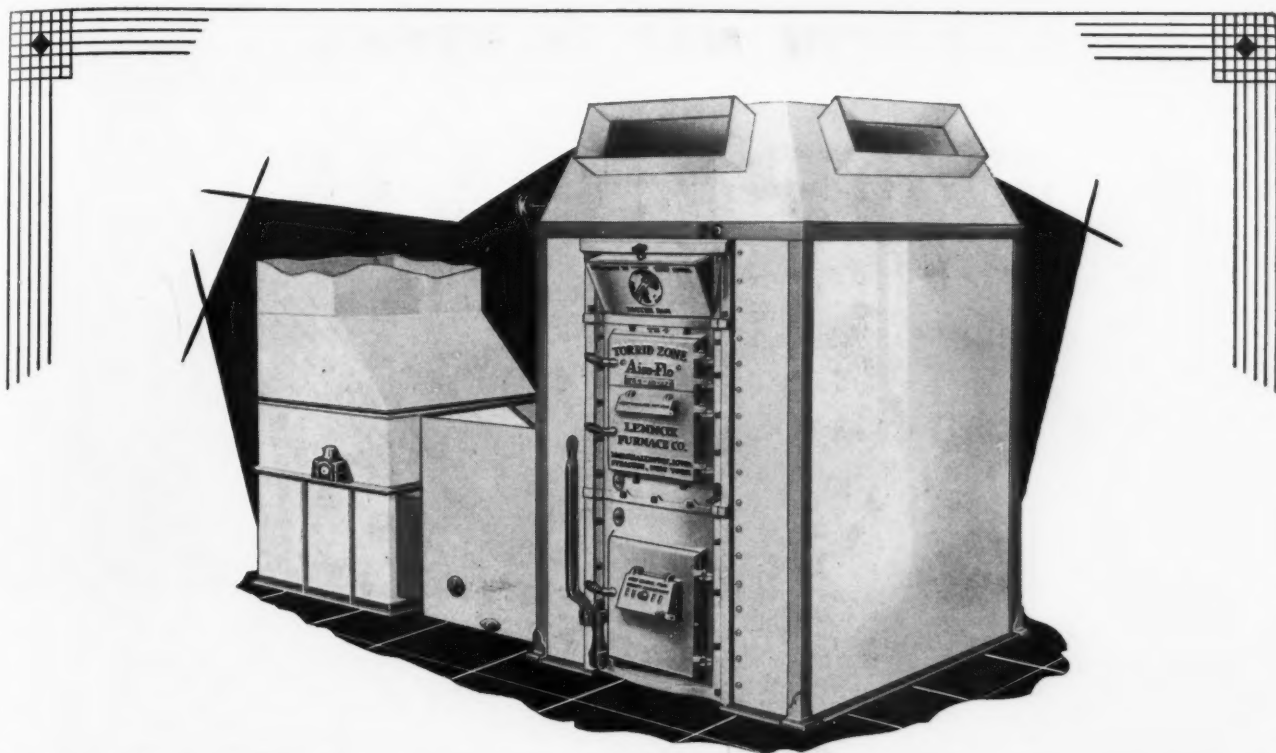
THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

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INDEX PAGES—8 and 48

[VOL. 100, No. 12—\$2.00 PER YEAR]

BUYERS' DIRECTORY—44 and 46



A Practical Air-Conditioning System With Simplified Aire-Flo Installation Code by Lennox

"AIR as clean, pure and stimulating as the sea breezes drifting across the fore-deck of an ocean liner"—that is the fascinating story you can tell when selling Torrid Zone Aire-Flo systems.

The Aire-Flo pictured above consists of any one of the many different types of Torrid Zone riveted steel furnaces with a specially baffled rectangular casing, a silent blower and an air washer or filter. The Aire-Flo casing baffles are the result of months of laborious research in our large forced air laboratory.

Lennox engineers... working in one of the most complete forced air laboratories in the industry... have developed the simplified Aire-Flo Code covering the installation of air-conditioning systems. The average mechanic can now figure and install the finest type of air-conditioning jobs... he is assured of positive heating, cooling and ventilating results.

Torrid Zone Aire-Flo marks another step forward... another achievement on the part of our heating engineers. It is fitting that the world's largest makers of gas tight riveted steel furnaces should be first to offer a practical home air-conditioning system.

AIRE-FLO is completely described in a beautiful new catalog. Write for your copy.

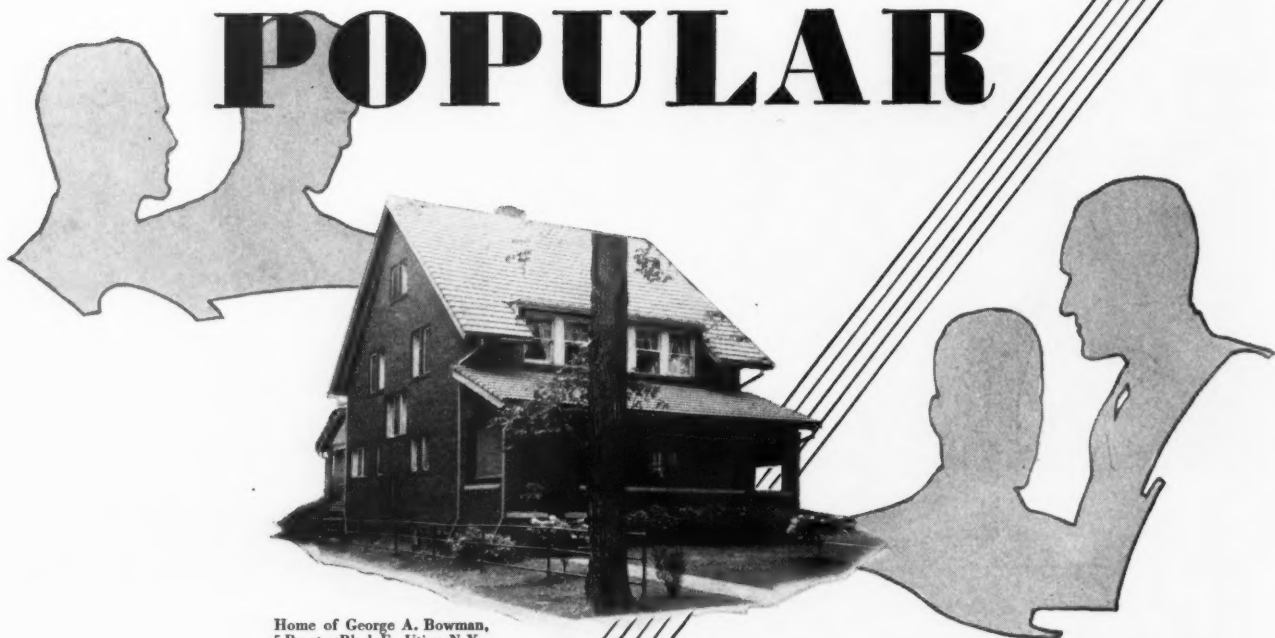
LENNOX FURNACE COMPANY, Inc.
MARSHALLTOWN, IOWA ♦ ♦ SYRACUSE, NEW YORK

TORRID ZONE Aire-Flo Air-Conditioning Systems

Say you saw it in *AMERICAN ARTISAN*—Thank you!

Where warm air is most

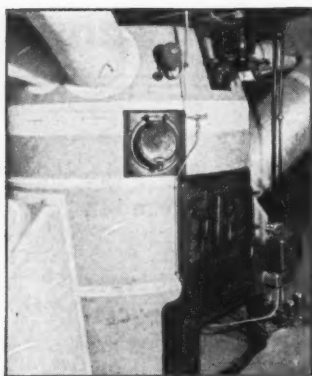
POPULAR



Home of George A. Bowman,
5 Proctor Blvd. E., Utica, N.Y.,
President, Munson Mill
Machinery Co., Inc. — heated
with "Silent" and warm air.

"SILENT" is

PREFERRED



No more enthusiastic endorsement of Silent Automatic oil burners can be found than among heating contractors in territories where warm air is the most popular method of heating.

Gust. Krack & Son, Erie, Pa., say: "Seventy per cent of our 'Silent' installations have been in warm air furnaces. We find that nearly all new furnace prospects can be sufficiently interested to make a complete oil burner installation."

"Practically 80 per cent of our sales of Silent Automatic have been in warm air furnaces," says Frank Siebert of Henry Siebert Sons, Inc. "In seven out of ten of our last Silent Automatic sales for warm air furnaces, we have sold entirely new furnaces."

Such letters are typical of many

which indicate that heating contractors everywhere are keenly alive to the tremendous profit possibilities of warm air *plus* oil heat. Experience based on scores of installations has demonstrated to these men that Silent Automatic most positively assures the quietness and dependable, economical operation so necessary to complete satisfaction.

Owners of fine homes—your best prospects for forced air systems—demand the cleanliness and convenience of "Silent" oil heat. Mail the coupon today, and learn how you can take full advantage of this opportunity for warm air installations in larger and more profitable units.

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C O U P O N

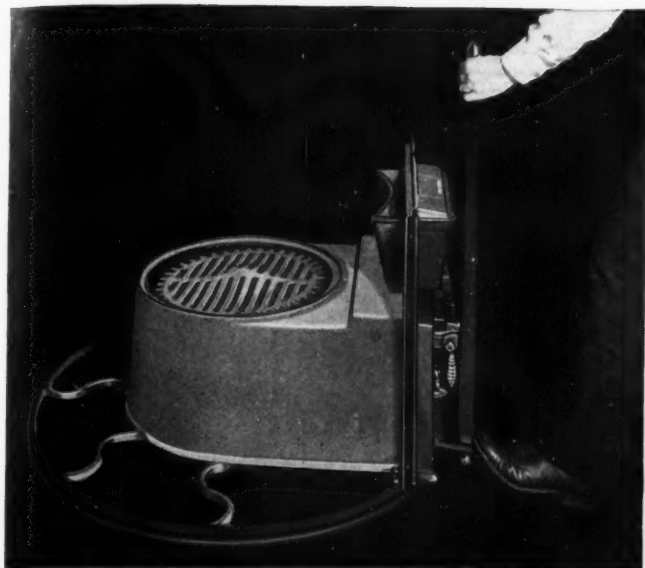
Silent Automatic Corporation, Detroit, Mich.

Please send me, without obligation, a copy of your booklet, "Oil Heat for the Warm Air Furnace", giving information on the installation of Silent Automatic with warm air systems.

Name _____

Street _____

City _____ State _____ (405)



"Just step on it" and trip the lever

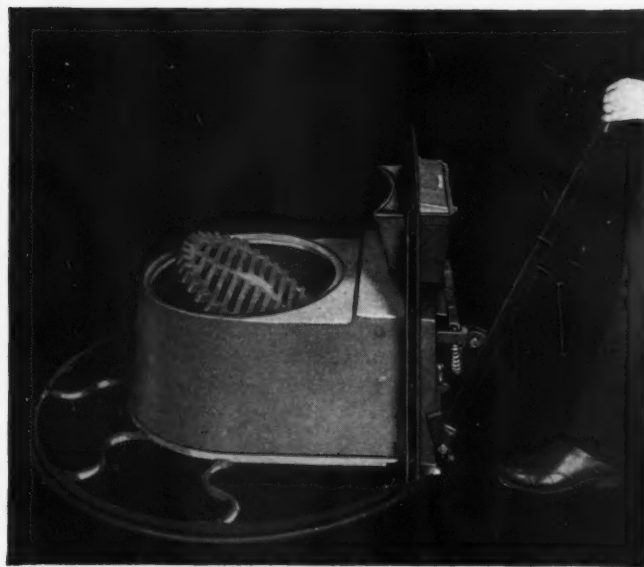
The EXCLUSIVE NiAGARA Trip Lever

THE Niagara is the only warm air furnace with this labor-saver. The Niagara Trip Lever is an example of the sales appeal which 40 years' experience has engineered into Niagara Furnaces. This device, and the Niagara duplex grate, and the Niagara smoke consumer, and other features, give the dealer plenty to talk about and make the Niagara easier to sell.

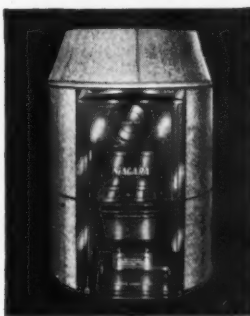
Dealers push the Niagara as illustrating the warm air heating method at its best. Abundance of heat, healthful home heat, much heat or little, busy people's convenience and comfort, clean home heat,—your home owner customers get them all in the Niagara at a sensible price.

The Niagara is one of the quickest assembling furnaces ever engineered and perfected with a view to increasing the dealer's profit. The coupon will bring the detailed story.

We carry a full stock of repair parts made from original patterns for Niagara and Monarch furnaces. We manufacture the well known Walworth Registers. Quotations upon request.



The grate tilts forward and cleaning the fire is a very easy matter



A handsome oxidized copper front flaked with gold adds to the salability of the Niagara Warm Air Furnace. Its good looks fit perfectly the modern standards of improved basement appearance.



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THE FOREST CITY FOUNDRIES CO.
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Send us your 1931 Niagara Healthful Heat Furnace Book.

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City..... State.....

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Founded 1880

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL

Covering All Activities
IN

Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

The address of Gilbert E. Olson proved one of the sensations of the National Warm Air convention. Mr. Olson is a young chap with a wealth of sound ideas. Even the old-timers found he knows his stuff in no uncertain fashion. He has sold and installed dozens of the highest type forced air systems in Omaha. In this address he details his sales methods and his design features. The article is well worth anyone's time to read and study.

* * *

There is a nice story of a heating plant which didn't work in this issue. The revamped job does work and just where the two jobs differ forms the basis for this article. If you have ideas as to what was wrong with the first system, you are at liberty to tell us all about it.

* * *

We've had to leave out some of your favorite writers in this issue. However, don't get worried, they are all right up in type and waiting to go. The favorites will be with you next time.

VOL, 100, NO. 12

JUNE 8, 1931

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JOSEPH D. WILDER
Editor

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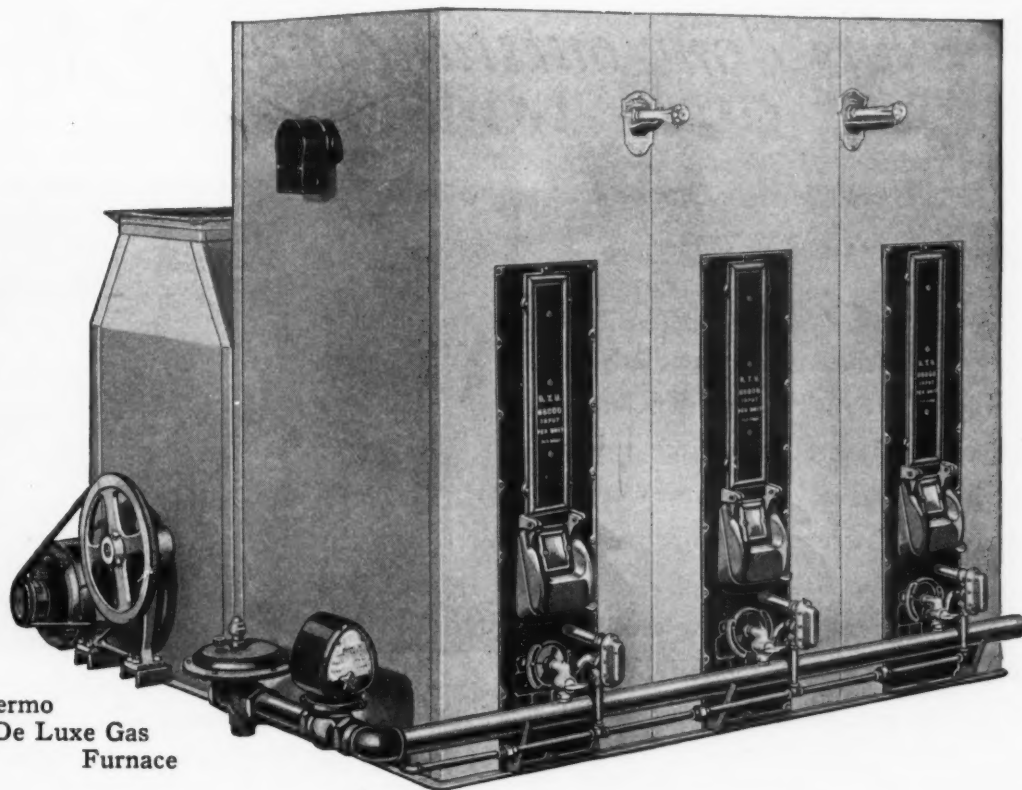
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variety of types for all domestic, commercial and industrial heating requirements and each type of furnace has many original "Thermo" features.

Be the first in your community to send for the "Thermo" story which is contained in an attractively printed booklet, just off the press. Write today to be certain of obtaining your copy without delay. Use the handy coupon.

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MANY SUCCESSFUL CONTRACTORS USE REVERE SHEET COPPER

TOLEDO CONTRACTOR *has done outstanding job*

*Fred Christen & Sons Co.
has written a story of success in copper*

Over 100,000 pounds of Revere Sheet Copper went into the addition to the Art Museum, Toledo. In the Fire and Police Alarm Headquarters Building, in the same city, Revere Sheet Copper was used in many interesting ways...in the cupola bestriding the ridge, in cornices, gutters and flashings.

These are only two of the jobs to the credit of Fred Christen & Sons Co., sheet metal contractors. For nearly five years, now, this firm has used Revere Sheet Copper . . . 100%.

Success in sheet metal contracting comes from two major factors . . . quality workmanship and quality materials. An example of the fine workmanship of this contractor is his showroom (illustrated at right). Gutters, leader heads, downspouts are all Revere 16 oz. Copper. The workmanship is perfect and is duplicated on their jobs, some of which are displayed photographically on the revolving rack.

For quality materials, Fred Christen looks to



Revere. With a background of 130 years rolling copper, with resources embracing 7 mills and controlling 50% of the copper rolling facilities . . . Revere makes a type of sheet copper for every building need.

You, too, like this Toledo contractor, can do big things with Revere Sheet Copper. In fact, Revere Sheet Copper and the Revere Plan will help you do big things . . . make bigger profits. Why not get in touch with Revere today? For further information write Revere Copper and Brass Incorporated, 230 Park Ave., New York City.

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Mention AMERICAN ARTISAN in your reply—Thank you!

Association Problems

THE twelve month period ending this summer will undoubtedly go down in industrial history as a period of association disintegration on a scale the country has never seen before. Big associations and little ones alike have become paralyzed, disbanded or even fallen completely to pieces. It doesn't seem to have made much difference what fields these associations operated in, nor what giants of commerce headed their lists of members, nor how rich and powerful were the groups backing them—they have all felt of the touch of evil days.

It is not amiss, therefore, to give some passing thought to the two national associations operating in our fields of heating and metal contracting and to the troubles of the local and state associations.

It is a commentary of association endeavor that any association sticks together and prospers just so long as that association has something definite and tangible to offer its members. Commercial annals are replete with the beginning and ending of thousands of associations which started with one grand idea, but disintegrated because that one idea did not possess enough value to keep members interested.

It is not our endeavor here to criticize, but it was very noticeable at the last national meetings of both our associations that most of the faces present belonged to those earnest and devoted workers who have built and kept these organizations running.

There was a startling lack of new and young men at those conventions.

Of course, in these hard times, only the man who really feels he can afford the expense of traveling is going to the meetings. Cost automatically eliminates many young men, business men who are just beginning the long climb to financial freedom.

But the fact that the young men can't afford to come doesn't remedy the situation that sooner or later new blood will have to be instilled in these associations.

We are not outlining here a panacea for association success. Perhaps there isn't any. But one thought does present itself.

After all, the average man doesn't graduate to national association co-operation without having served

some apprenticeship in his local or state associations. The usual beginning is first the local, then the state and finally the national. Interest grows and becomes progressive just in the ratio that these two stepping stones provide him with real causes to work for.

Local association co-operation is far too frequently pooh-poohed because contractors don't like the men in it, or because they say some member makes long promises but delivers short, or a dozen other reasons which anyone can call to mind. Nevertheless, if these local associations fail, then the state and national are too far removed to be of much consequence to the average contractor. He requires close-at-hand evidence of association value.

What makes one local organization a going affair and another a total failure is open to argument. However, we do know that success depends largely on two things; first, that there be a few go-getters willing to work like the mischief, anxious to bring into the association every contractor in town, and with determination enough to stick to the job in the face of apparent failure; and second, some program which interests prospective and present members.

As to the willing workers, every community has them. But as to the interesting program—much is lacking. There can be dozens of things for the local association to keep busy on. Perhaps local building codes require revision, perhaps local general contractors and architects are running the sub-contractors ragged, perhaps there needs to be some uniform and understandable system of cost accounting taught every contractor in town, perhaps local and state legislation is needed, perhaps the town needs the Standard Code enforced, or a dozen other causes all of which should keep most local organizations busy and interested for months or years.

Such endeavors should be fostered. For only in them does the contractor find something to hang his interest on. The local must be the first step toward state and national enthusiasm.

It should be the life work of every national member, then, to promote interest in local affairs, then in state affairs and last in the national association. If there is built up this three-step interest the success of all is assured.

Complex Copper On

This is the remodeled tower showing the batten type copper roof on the spire and the copper cornice, column, balustrade and dome above. All this copper replaces stone work which had become dangerous

(Photo by Wisconsin Trade News Bureau)

A DECIDED adaptation of ornate design in the modern architectural motif is reflected in the recently completed renovation of the tower of Milwaukee's city hall. Approximately 390 feet



Above—Here is a group of finished copper stampings. The man is holding up a section of a column capital. Standing at the left and lying on the bench are quarter sections of a baluster. Each stamping forms a triangular quarter of the base and top and a quarter of the mid section. Sections were soldered by the sheet metal contractor

(Photo by Wisconsin Trade News Bureau and American Photo Co.)

above street level, workers for the Louis Hoffman Co., pioneer Milwaukee sheet metal concern installed about 11,000 pounds of copper to complete the tower.

Readers who have visited Milwaukee will remember this building as one which has dominated Milwaukee's skyline for many years. Originally all the ornamentation for the tower was in stone, but weathering caused disintegration to set in endangering pedestrians. It was decided to replace the stone work with metal.

Copper was selected by the city architect for the tower because of its light weight, together with the fact that its installation would provide a safety factor and not endanger people on the street. Hip shoulders installed along the copper sheeting directly below the newly



Copper Replaces Dangerous Stone On Milwaukee's City Hall

Installed tower, were originally of stone, but this has been replaced by copper because of falling particles.

Considerable work and planning was necessary before actual construction could take place. It was necessary that the ornamental copper capitals and balustrades adorning the tower, be in harmony with the architecture of the building. Accordingly, artists of the Milcor Steel Co., Milwaukee, first made clay models in accordance with the city architect's plans.

From these models, plaster of paris casts were made and from casts, the iron die. From the die, hammer exerting a force of three tons, stamped out the copper sheets, which were then assembled at the Louis Hoffman company plant and installed by them.

It is significant to know that the capitals and balustrade installed on the new tower are not of a stereo-

typed nature. They were designed in accordance with architect's details and made to conform to the type of architecture which the city hall exemplifies. The sheet copper tower has been made and installed to last indefinitely and located between the Milwaukee river and Lake Michigan, it will not be long before it assumes a green and mellow hue. At night the tower is lighted from within and adds immeasurably to the city's skyline.

When the remodeling of the

tower came up for architectural advice, members of the Louis Hoffman company and representatives of the Milcor steel company sat in conference with the architects and explained just how copper could be used to save weight, faithfully reproduce any design desired and also save money over heavier and more costly stone. As a result of this sales effort the copper was adopted instead of stone.

There is considerable interest about the metal work other than

Right—Stamping the capital sections in the specially prepared dies. All stamping work was done by power presses

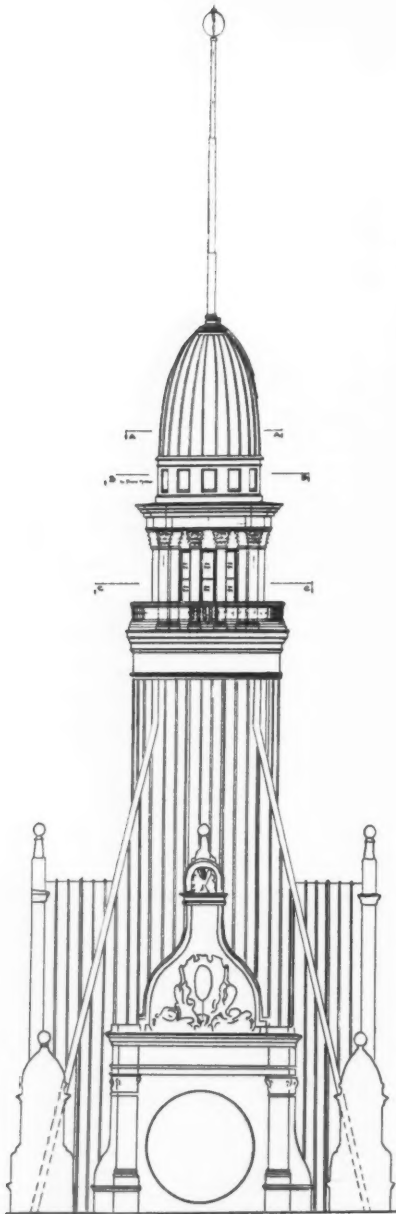


Left—Artist preparing the plaster of paris models from which the dies were made. Every intricate molding had to be made in the model

(Photos by Milwaukee Trade News Bureau and American Photo Co.)

the ornamental column capitals. The steep roof below the balcony is now sheathed in batten type copper roofing. The sheets were used in 8-foot lengths. Most of the sheets could be cut rectangular due to the steep pitch of the hips. The tile-shaped hip sections are copper. Originally these were stone, but became dangerous.

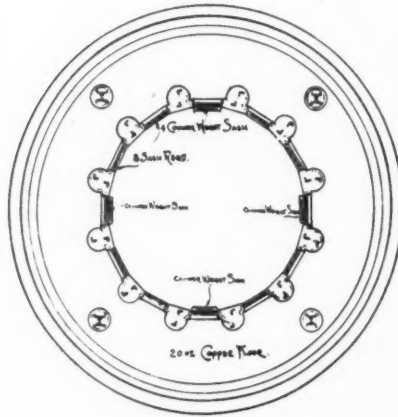
Above the pitched section there



Elevation of the tower showing details of the application of copper to the tower, balcony and dome. Most of this copper replaces stone

is a wide, plain-faced copper cornice surmounted by a copper balustrade. The balusters were formed by the Milcor company to special

design. These balusters were stamped in four pieces. One of the illustrations shows a section beside the capital. Each section was composed of the one quarter of



SECTION-C-C.

Section at C-C showing how column bases stand on a copper deck behind the balustrade

the baluster together with a triangular quarter of the base and top. The sections were then soldered and smoothed. The illustrations show how the cornice sections were cut and seamed.

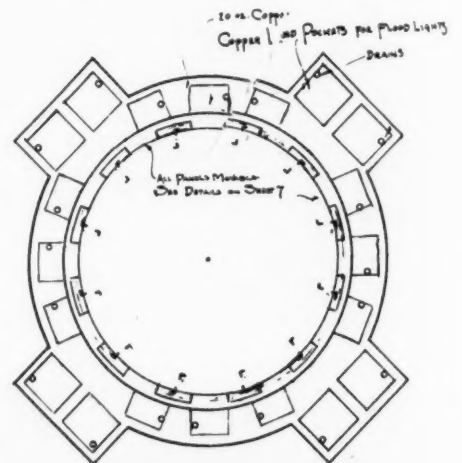
Set behind the balustrade there is a circular dome alternating round columns and depressed glass windows. These columns are copper and the capitals used are those described earlier in this article.

These columns support a heavy, projecting cornice from which project four square column heads. Copper sheeting of plain face was formed in the shop to the design of the original stone heads and placed on suitable framing. These projecting heads form one of the features of the tower as viewed from the street.

Above this cornice there is a section of paneled copper, again of plain face and depending for ornamentation upon the light and shadow of the depressed faces. Above this panel section there is a high mosque dome of batten type copper roofing. From the apex of this dome a high flag pole projects. The base of the flag pole is reached through a sliding scuttle door high up in the dome and a brass ladder.

During installation, a wooden scaffolding was built around the entire tower so that the workers were able to carry on their operations without danger.

The Louis Hoffman Co. has been doing business in Milwaukee since 1878. It was originally the Hoffmann-Bauer Co. Louis Hoffmann, founder of the firm is no longer actively engaged in its operation and his three sons, Adolph, Angelo and Edward Hoffmann are now actively engaged in the business.



SECTION-B-B.

Section at B-B at the cornice level. This cornice carries flood lights in pockets. The top of the cornice and the pockets are copper lined

In this issue we conclude the series for gas equipment salesmen written by L. W. Millis. Perhaps you haven't considered the amount of time, labor and research behind these articles. Many important points have been brought out for the first time. The facts established should be valuable to any heating man operating in territory where gas is an established or about-to-be-established fuel. Any questions will be gladly answered by Mr. Millis.

MODERN INSTALLATIONS

By GILBERT E. OLSON

Most of the Address Given by Mr. Olson to the Dealers at
the N. W. A. H. A. Convention, May 12, 1931

TO give a talk on modern installations is almost a waste of time, because while I am here talking to you gentlemen, our industry and profession is going ahead so rapidly with new methods constantly being discovered, and new appliances perfected that we may suddenly find many of our practices obsolete. Perhaps I may be able to present this interesting subject from just a little different angle, and through an exchange of ideas and thoughts, we may all be better able to apply our knowledge in a more practical way.

My experience and observations of the warm air heating industry as a whole dates back quite a number of years. I practically grew up in the tin shop and, as a youth, I was always expected to report to the shop after school and on Saturdays. You know it is real interesting for me to recall the development of the warm air heating industry. A good many of the old timers were graduates of the old stove and base-burner days. You can easily remember how the orders would come in to go out to so and so's house and take the base-burner out, clean and polish it until it looked like new, and then perhaps drag the brute to the third floor and set it up.

Then one day the furnace came in. The heater was to be placed in the basement and tin pipes were to be run to the various rooms. What an awkward and unruly thing this monster in the basement sometimes proved to be. Of course these installations were not perfect, but what an improvement over the old stove or base-burner. Now follow me. There were many objections to the cost of operating such a central heating plant. Old Uncle Josh never needed to burn over two tons

of Pennsylvania nut to heat his house, while that young upstart banker over the way had to use six tons to keep warm last winter. I mention this now because I may want to refer to this point later in my talk.

The newness of the idea soon wore off and the clamor and demand soon arose for a clean, uniform, humidified warm air furnace system. To be sure there were many hard blows dealt to the warm air heating industry during this struggle for better warm air heat. It was then we discovered some of the many faulty and almost ridiculous practices, which gradually opened our eyes and eventually caused the Standard Code of warm air heating to be created.

Last 10 Years Has Shown Much Progress

Think what progress has been made during the past ten years in this, our chosen profession—brought about, don't forget, by the concerted effort of furnace and fitting manufacturers and a great number of live, wide-awake dealers. What a future we now have ahead of us; what an interesting profession; what a service to mankind we can render, and last but not least, what a higher plane of living and recreation we can now enjoy by being cheerfully and handsomely remunerated for a service well done.

Am I enthused? Am I all ready to go? Have I got the ambition? Have I got the willingness to learn? Have I got the stick-to-itiveness even though there may be an occasional tough one to analyze? Have I got the realization that I have a heating de luxe to sell that, mechanically speaking, has no equal? Have

I got the backbone to go to the builder of the finest of fine homes and sell him my service? I'll say I have, and so have you. If you are not doing it now or getting prepared to do it, I can only offer you my sympathy, and I don't believe I would even waste the flowers on you when you're gone.

Before I go any further, out of courtesy to some of you gentlemen who I referred to a while ago as getting along in years, may I offer for your approval a suggestion or two, which, while not always steadfast and absolutely sound, are, generally speaking, very effective and workable? There are those who have not the zeal, or if they have the zeal they do not have the time or ability to set about and train themselves for modern heating systems, especially their design, their fabrication or the methods employed for their sale.

Obviously then it is good practice to train some younger blood into handling this specific phase of the business. To those of you who have sons of your own of an age that can be trained to carry on this work, may I congratulate you? But if you tell me that you're not going to let your son struggle on with your business, then I must condemn you. I cannot fathom the motives behind some men, who have in a measure made a success of their vocation, but as far as recommending it to his son, why that's out of the question.

Think what a wonderful start in life your boy would have in being able to start off in business where you are leaving off. Think what a service you will be rendering your clientele when you train your boy to install that air conditioning service de luxe which they have

been waiting for these long years. Get some new blood in that organization and don't be a quitter. If the first jobs don't go over so big, stay with them; get some help and don't be bashful about it. We all make mistakes. When you do make a mistake, be cheerful about it and be only too glad to fix it; and don't squabble about what it costs you to fix it. Anything that is worth while cannot be had very cheap.

With the splendid information received from our mutual friend, Jimmy Miles, and with the many other sources of information and help, I can see no reason for your being even timid about getting your share, at least, of the air conditioning work in your community. Remember you are not alone in this struggle for existence and there have been many who have fallen by the wayside due in many cases to their lack of aggressiveness.

What is it that holds us back and keeps us from making the proper progress in the furtherance of this new and most interesting endeavor of air conditioning? I have heard the expression and so have you, that "I'm not going to do all the experimenting and take all the chances with these new ideas. I am going to wait until they get all the kinks out and then I'll start." Those may be noble intentions and all that, but, my dear friend, the day will never come when all the kinks are ironed out. What we may think is the last word and the ultimate in warm air heating may be extremely obsolete in a few years. What would you think if your boy came home and said, "Dad, I don't want to go to school any more. They are always exploding so many ideas and they are trying to solve so many problems, I believe I'll wait until they get them all worked out. I'll wait until they know everything they talk about is absolutely correct before I go back and study any more. What's the use of wasting so much time and money on all this experimenting?"

I don't believe we would listen very favorably to any such a request or desire from our youths. We have

Gilbert E. Olson is one of the younger warm air heating contractors of Omaha, Nebraska. The business was founded by Mr. Olson's father who is still active. This company has literally dozens of high class forced air installations. Co-operation with architects and home builders is one of the firm's essential selling plans

recognized from both experience and history that it is necessary not only for individuals to progress, but also for masses as well. An example might be had by recalling your history of the Chinese people and the Chinese wall. Progress certainly was evident and extremely manifest, but confined, however, to very few. Eventually the knowledge and the self satisfaction of the few who were progressive was buried with the carcass of the sojourner and this great potential nation was stunted in its early youth.

I draw your attention to this fact for two reasons: First, it is necessary for the industry as a whole to become deeply interested in air conditioning and modern installations so that the efforts may make a noticeable impression on the buying public at large. After all, if we can get the public to buy our service, we are fulfilling our physical obligation in business. Secondly, I would have you know my personal view of a person or organization which under the cloak of having an original idea concerning a method or appliance tries to keep their find under a bushel basket for only a select few. We are not living in a Chinese wall period. We have discovered that mutual knowledge and understanding always gives a greater remuneration and surely a better democratic spirit.

Service is the keynote of modern business adventures. Sometimes we are prone to sit back in disgust

at the very word "service." Why, may I ask? Do we think that we are just giving the public something for nothing? Do we assume the attitude that they are not entitled to such efforts? If such thoughts harbor in your mind, may I in my humble way give you my picture of service?

Suppose tonight before you retired you had to put in an order for so many gallons of water, for so many light rays, for so many B.t.u.'s, etc., for our meager existence, then we would have an irksome task to perform each day. Of course, if we ran out or didn't order enough we would just have to suffer. No, instead of that the good Lord anticipates our needs and supplies our every want.

When we are in need of these necessities we know to whom we should turn. In a like manner, if we could create a desire among our fellow men that when they were in need of our services they would know we were ready to serve them. It would then be unnecessary for them to look further for their needs. I am reminded of a story they tell of a railroad president on an inspection trip to the various divisions under his direction. Among other features and formalities was a banquet given by one of the divisions in honor, of course, of the president. Seated at the speaker's table were various officers and superintendents and at the end of the table an aspiring young foreman by the name of Johnson.

In a moment of after dinner relaxation the president suddenly called to Mr. Johnson, "Why I have one of your cigarettes?" As though the words had had super radio effect, Johnson leaped to his feet, all smiles, and rushed over to the president, opened his cigarette case and offered the president a cigarette. The president took a cigarette, put it to his mouth and then looked up at Johnson and asked him if he had a match, whereupon Johnson reached in his pocket, produced a match, struck a light and held it in position so that the president might light the frag. After

the first puff of smoke and the same time extinguishing the match, Johnson exclaimed, "How's that for service?" Much to the surprise of those around, the president answered, "Damned rotten; I shouldn't have had to ask for it."

Having thus committed myself, it follows necessarily that perhaps I practice what I preach and give you a few experiences I have gathered in the realm of modern air conditioning installations, their sale and promotion. How do I know that there is indeed an earnest desire by the prospective new home builder for a modern air conditioning system. This desire has been brought about by an ever changing regime of modern living conditions.

Construction Changing

The type of construction employed in the modern American home has changed, the interior furnishings have changed, the basement, which formerly was more or less a catch-all and storage room, is becoming the recreation center for the family. Modern invention has brought to us automatically controlled heat. Living conditions in general are more trying, congested, and exacting. We work and play at an unheard of pace. It therefore follows that in order to provide the body with the necessary comfort, we must have the air conditions next to perfect. You may justly ask, "How do I know there is a definite demand for modern installations?"

It may interest you to know that a leading steam and hot water journal recently raised the question if it were not possible for them to offer their clients some of the advantages obtained in the modern warm air systems. Don't forget that it was only a short while ago that this condition was reversed.

As a further evidence, I need but point to some of our leading home magazines and periodicals which are featuring articles, comments, and installations of air conditioning as found in the modern home. My personal experience among leading architects and home builders has

very forcibly demonstrated to me that the public is waiting for our services. I think you will agree with me if a leading architect would tell you as one has already told me that he had designed and recommended for the last time radiator heat for any of his homes which we would plan in the future.

See the Architect

We make it a practice that immediately upon hearing of a proposed new home, we communicate at once with the architect and the owner and have them allow us a few moments of their time so that we may explain our air conditioning system, and how well it will fit into the new home. We ask for the permission to make a layout and write a set of specifications covering the complete installation of our system. This request is seldom refused. It then becomes necessary for us to prepare in a neat and correct manner an attractive and mechanically right detailed layout and specifications. I cannot stress the factor "neatness" too much because it has a direct bearing upon the prestige of the system we propose to install. We endeavor to make a complete survey of the project at hand. We find out what the heat requirements are in terms of B.t.u.'s and base our calculations accordingly.

Upon the return visit to the architect or owner after having prepared our layout and estimate for the cost of installation, we have another opportunity to go into complete detail on the advantages of a warm air conditioning system. We are offering the prospective home builder something new, designed to fit in with the requirements of a modern home. With the proper reasoning and careful selling you can expect to close the deal. Should you fail the first few times, do not be discouraged, but try it again the next time the opportunity presents itself. If nothing else is gained from the experience you will at least be training yourself and your organization for that class of work which is sure to dominate in a short space of time all heating practices.

Another avenue of endeavor in the field of air conditioning is the modernization of the home that is already built and which, of course, would have an obsolete system. Do you realize the potential market this particular field has to offer? Very few of us can realize the possibilities that lie dormant in our immediate community. We are living in a day and age where ideas, appliances and practices are constantly being talked about and sometimes occupying an entire evening's discussion when a neighbor, for instance, who drops over for a visit. A home that has a modern air conditioning system immediately becomes a standard for the rest of the homes in that vicinity, and that "keeping up with the Jones" spirit certainly will leave its impression in a modern progressive furnace man's business.

It is not uncommon for the host to drag his callers in to the basement—now don't get me wrong—to show them his new air conditioning system. If your name happens to be conspicuously present on that installation, you may rest assured that sooner or later you will have further inquiries for similar installations. To me this kind of advertising is the highest class and the most valuable that can be obtained.

Needless to say, then, that it should be our daily practice to make every installation complete, neat, and tailored to fit the individual characteristics found on each job. Workmanship will play a tremendous part in the success of modern heating installations.

A Simple Method for Designing Ducts

Here is an interesting method we use to lay out the trunk line for forced air work which we have found to be very practical and at the same time reduce fabricating cost. The process is simply to first locate the heater at the location determined by conditions on the job, preferably close to the chimney. From the front of the furnace in the direction of the most number of the heat outlets which are to be connected to the trunk line, roll out a

strip of red rosin paper. Oftentimes the trunk line is more than 36 inches in width. This then necessitates the use of two strips laid side by side.

If there happen to be outlets which are off to one side or another of the main row of heat outlets, run a strip of the same paper at right angles to the main strip. Next obtain a plumb bob with approximately ten feet of chalk line attached to it and plumb down to the floor the center of each outlet that is to be connected to the trunk duct. With these points plotted on the paper, and sometimes it often becomes necessary to lay a short stub of paper from the trunk to the point which has been plotted, it is now possible to start at the furnace with the width dimension which has previously been determined from your data sheets and draw a straight line to within two feet of your first outlet. Then it is very easy to scribe an arc which will gracefully change the direction of a portion of the duct towards the outlet which is to be connected.

The next step then is to measure back the proper distance which the trunk line is to be diminished on account of having taken off a certain portion of the load and start another straight line parallel in direction to the one just completed. This line is continued naturally to the next outlet which is to be connected. If all the take-offs happen to come on one side of the trunk line, a straight line may be drawn parallel to the opposite side of the trunk line and continued then to the farthest extremity.

We have found from experience that it is advisable to install a transition fitting after the turn has been made from rectangular size to a corresponding round dimension which would be of course standard pipe size. It then becomes very simple to connect by means of using the regular adjustable warm air elbows the trunk line with the stack boot or outlet.

After the trunk line has been thus drawn out on the paper, simply take the hand shears and trim the

Here are some of the sales policies followed by Mr. Olson:

Immediately contact the architect whenever a new house is listed.

Make a NEAT drawing showing the system proposed for the house.

Figure every job down to the last detail.

At every opportunity sell the architect and home owner on the advantages of warm air heat.

Make the arrangement of the equipment further the present day use of the basement.

Talk warm air heat everywhere.

paper on the marks thus drawn, being careful to match mark all loose pieces of paper. The drawings then can be taken to the shop, laid upon the flat sheet metal and the trunk line retraced to the metal. It is good practice to keep your trunk ducts nine or ten or even twelve inches deep and have all the take-offs of the same depth reducing the volume by reducing the take-off dimension. This allows the use of a straight side piece of metal which can have the hammer lock or Pittsburgh lock fabricated on each side and the broad part of the trunk which naturally would have all the curved portions will have just a single edge to turn.

It is advisable also to have the sheets on the broad dimension of the trunk sectioned together by means of a $\frac{5}{8}$ -inch standing angle S lock. It is good practice upon completion of the trunk installation to cover the entire duct with a neat covering of asbestos paper. After all, the neatness and the tailored effect that the trunk has, goes a long way toward making a very handsome job.

Do not be ashamed to tell your story wherever you may go. Invite discussions on the subject, pro and

con. Let your friends know in an understanding way the merits of the service which you have to offer. Anything that is new always commands attention. If you have put your story over to your friends, they will pass the word along in their conversation to their friends. Familiarize your own organization so that they may be constantly on the alert for prospective installations that you or your salesmen may immediately contact.

In this connection, your telephone, although a common item in the office of every one of you gentlemen, may be placed in effective use if thoughtful and careful application of its possibilities are carried out. Now is the time to put a well trained telephone salesman to work. Equip him with a very concise, to the point, and descriptive visualization of some of your present customers' heating plants, and how they may be modernized.

I only wish time permitted for me to enter into detail on the valuable asset your telephone may become. Too often we consider the telephone as a necessary liability, whereas a substantial increase in new business may be created through the proper utilization of telephone selling. It is necessary to train your telephone operators in careful and courteous telephone manners. Remember that the personality of the individual talking must be entirely conveyed through the wires. All too often we forget this most important fact and a very unsatisfactory impression is left with our customers through our incorrect telephone usage. Your local telephone company will be glad to co-operate in numerous effective ways to increase the value of this phase of selling.

In closing, may I briefly call your attention to the fact that in every community, in every industry in that community, there is one individual or one firm that is the leader in his respective vocation and stands out head and shoulders above his competitors. Do you carry that banner in your community? I trust you do.

National Ass'n Sheet Metal Distributers Discuss Industry's Problems

ON May 20 and 21 the National Association of Sheet Metal Distributers held their first meeting since the adoption of their new association name. Prior to this meeting the organization was known as the Metal Branch of the National Hardware Association.

Although the general impression about business was not too optimistic there seemed to be a general feeling that some improvement should be evident by the end of this year.

In opening the convention, G. Sumner Wilson, president of the National Hardware Association, brought best wishes of that body.

President F. O. Schoedinger responded. As the theme for his address he chose to stress the need for co-operation and study so that the pressing problems of the industry might be thoroughly worked out. As a part of the renewed endeavor he pointed out that the association will actively push and study cost accounting and economic waste. Sales ideas, materials, distribution and discounts were some of the other problems outlined.

Since many of the members have only indirect contact with sheet metal contracting firms, the program had W. C. Markel, Secretary of the National Association of Sheet Metal Contractors outline the work of his association.

One of the most interesting addresses of the first day's meeting was that of S. A. Knisely, trade research division, National Association of Flat Rolled Steel Manufacturers, Cleveland. According to Mr. Knisely, a recent survey showed that there is a potential market for flat steel products of 7,000,000 tons annually. Architects are awake to the advantages of metal and are planning revolutionary uses, such as thin, insulated

metal exterior walls for buildings, steel houses and assembled steel rooms.

One of the liveliest and most interesting subjects of the convention centered around the matter of better sheets.

The report of the sheet steel committee cited the chief problems facing distributors, as direct sales by mills of less than carload lots, direct shipment on jobber accounts of less than carload items, shipments by mills of mixed carloads of warehouse items, and a lack of adequate quantity differentials.

Decision to petition mills for a restoration of the former 2 per cent discount to distributors on galvanized sheets and long ternes was reached at one of the sessions of the sheet steel group following considerable discussion. As proposed by F. J. McNeive, W. F. Potts Son & Co., Inc., Philadelphia, chairman of the association's sheet steel committee, it was decided to ask mills for this increase only on coated sheets which would return these items to the same basis as that now in effect on tin plate and terne plate.

In reporting for the association's committee on terne plate, Robert H. Lyon, Lyon, Conklin & Co., Inc., Baltimore, suggested a standardization of brands of terne plate as a means of simplifying sales on this product.

Pointing out that variations in zinc coating on galvanized sheets for roofing purposes, with consequent difference in wearing qualities, had seriously handicapped sales in the agricultural districts, J. D. Conover, American Zinc Institute, New York, presented the results of a wide survey conducted by the institute in determining the effect of zinc coating on the wearing quality of roofing sheets. He explained that roofs put on 20 or

30 years ago ordinarily carried a very heavy coating, ranging up to 3 oz. per sq. ft., and invariably gave long periods of service. Now, however, sheets with a coating of 0.8 oz. per sq. ft. are commonly sold, and in many cases are badly rusted in three to five years.

At the evening banquet, D. M. Strickland, manager of the development department of American Rolling Mill Company spoke on Changing Tides. This address has been previously reported in American Artisan.

Vice-President A. W. Howe presided at the second day's meeting. The first speaker was Lawrence I. MacQueen whose subject was "The Value of the Middleman's Profit." Mr. MacQueen proved a powerful speaker. Many readers will remember the address he made last year at the Pittsburgh convention. Briefly his points were—Too many men are trying to eliminate some other man from business. They had better spend this energy on improving their own operations. Manufacturers, jobbers and dealers must adjust themselves to changed conditions. Trying to eliminate the middleman is foolish and leads nowhere. The jobber must give more and better service if his position is to be justified.

The following officers were submitted by the nominating committee and elected to office:

President—F. O. Schoedinger, Columbus, Ohio.

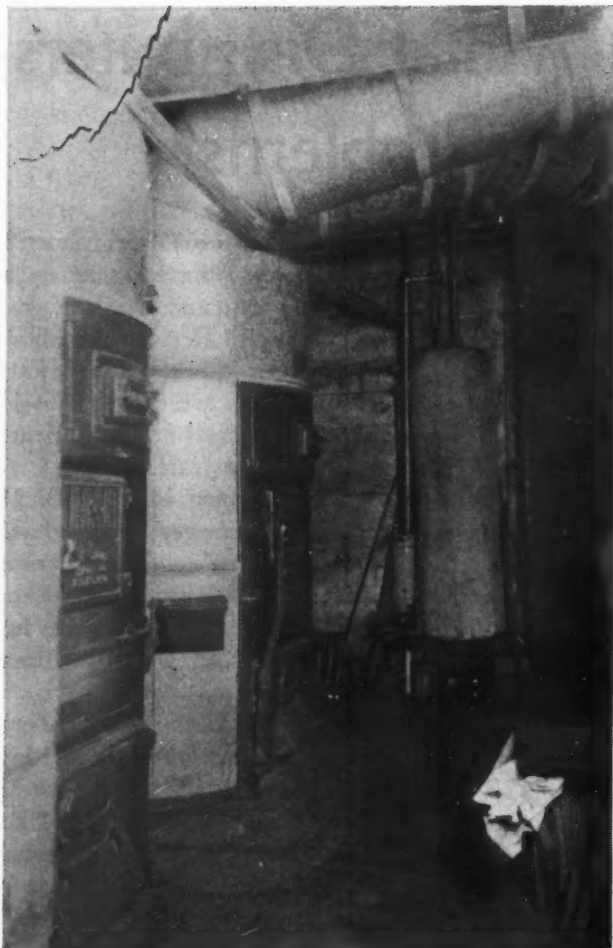
Vice-President—A. W. Howe, Cleveland.

New Member of Executive Committee—George O. M. Johnson, Pittsburgh.

Other officers are—

Secretary-Treasurer—George A. Fernley, Philadelphia.

Executive Committee—J. F. McNeive, C. S. Harper, W. H. Howe, L. D. Mercer.



▼

This is the present heater arrangement. Warm air comes off the bonnets of the two furnaces as round pipe, becoming rectangular ducts outside the heater room walls. Operation is hand firing using a combined lump and slack. The fans are behind the casings

▲

They Don't A and Here's C

There are numerous windows, some quite large.

In preparing the preliminary plans the architect incorporated an indirect steam system with auxiliary ventilation. These plans were changed to warm air, but the ventilation system remained.

The system which was installed and did not prove satisfactory used three heaters with one long supply duct for the entrance end of the building and short runs for the front of the auditorium.

Let us study the layout for a minute. One of the heaters feeds a large duct which exhausts into the social room in the basement. There is also one stub to another basement room. The middle heater feeds into the long run which passes along the ceiling of the social room and supplies four registers on the auditorium floor. One small register is fed off this trunk at the first turn.

The first two heaters also supply jointly warm air for one of the

CHURCH heating with warm air is an interesting field for the heating contractor because successful design calls for careful analysis and the application of all the contractor's past experience.

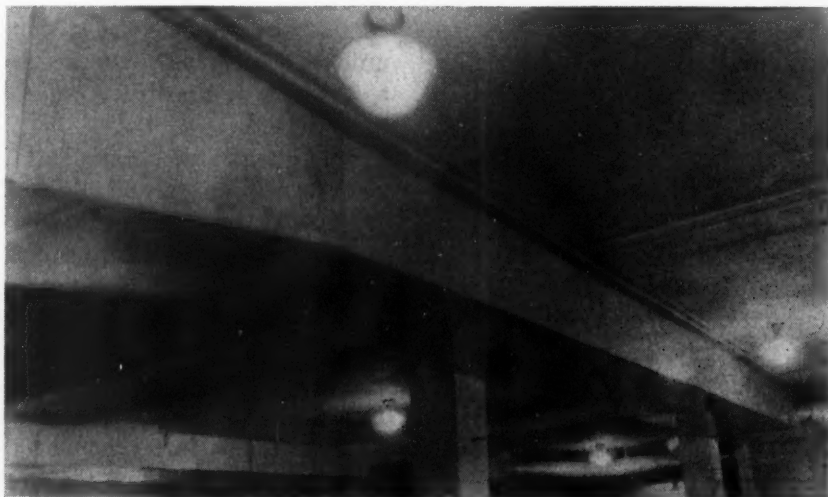
As Platte Overton has pointed out, the heating of churches often goes "haywire" because some one factor was overlooked.

As an illustration of this point we publish here the heating layout for a warm air system which didn't work to the congregation's satisfaction and another which has gone through one winter without a complaint. Details are given and readers can study and compare the two systems.

This church is a brick building 73 feet deep and 42 feet wide. The English basement houses the social room, heater room and some small rooms used for meetings. The first floor has the auditorium with a 22-foot ceiling and plastered walls and

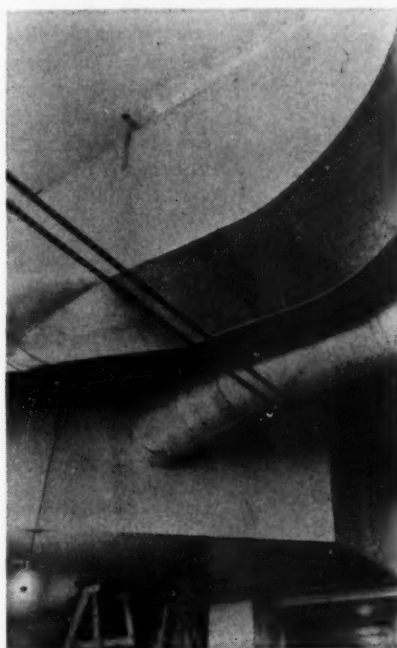
ceiling. Over the front entrance there is a balcony which projects some 13 feet out over the auditorium. The front of the church has the sacristy, choir room, choir loft, pulpit and study rooms.

The exterior walls are load bearing brick, with no exterior facing, lath and plaster on the inside.



This was the warm air duct in the first system. It now brings cooled air from the entrance end of the auditorium

It's Not All Work! It's One That Had to Be Revamped



Some of the piping just outside the heater room. One of the warm air leads changes here from round to rectangular

large grilles placed in the wall of the auditorium.

The third heater supplies heat for the small rooms behind the pulpit.

It will be noted that at the entrance end of the auditorium there are two large vent faces connecting into a stack which exhausts through the roof. These faces are 20 by 28 inches. Similar faces are located in the back of the social room.

The cold side of the first system uses a cold air room where the fan was placed. The fan was also connected to a large outside air supply so that in operation both inside and outside air were introduced to the heater.

The main complaint of the system was that in spite of heavy firing the temperature inside was never quite up to the comfort zone and on real cold days heavy drafts were noticeable.

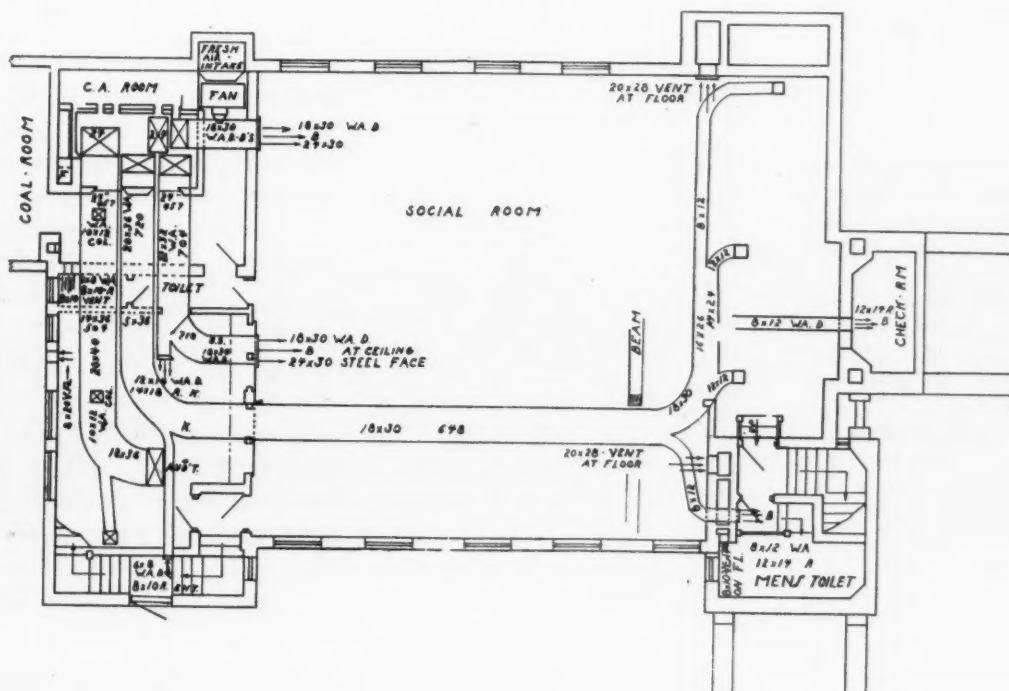
The second system installed de-

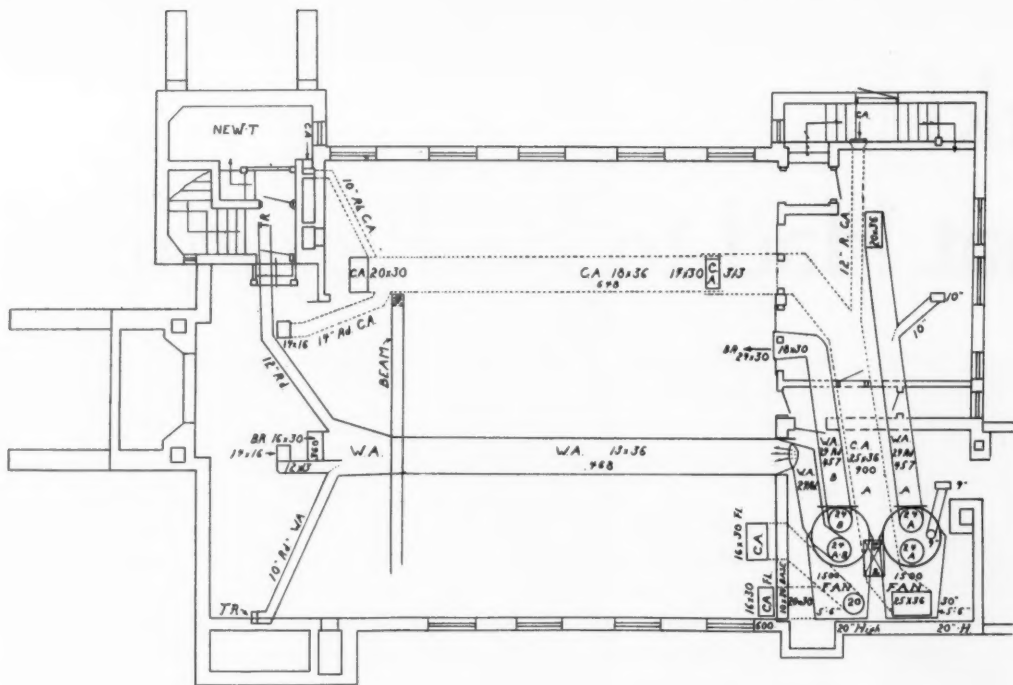
parts quite radically from the first. Look at the plan for a moment. The first thing noticed is that the vent stacks were closed up so that there is no exhaust from the rooms. To replace this a portion of the old supply duct was incorporated in a return air system which brings air from the rear of the auditorium, especially from the entrance hall and the rooms adjoining where cold air is present.

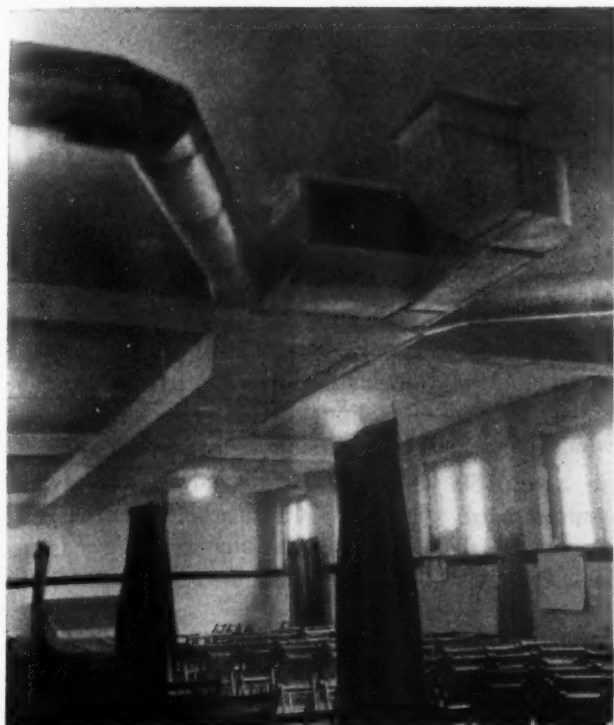
A secondary trunk system was built along the ceiling of the social room and has the same inlets that were used for the end of the first run. However, two of the first system inlets were changed to act as return air grilles to collect cold air from the entrance doors. And a new warm air register was installed in the entrance room.

The principal change in the heater system was the change from three to two heaters. As can be seen by the photographs these are

This is the heating system designed and installed first. Note the one long warm air trunk and the presence of large vents at the rear of the church. Outside air is also introduced to the fan here. The system worked, but not satisfactorily







▼

This is the end of the warm air run in the social room. Note transition from rectangular to round for branches. These ducts were made up as top, bottom and two sides. The pieces were assembled on the job with standing edge S clips driven across joints

▲

in a lessened fuel cost and a quicker and easier response to heating requirements.

There are some details of the new system which may be interesting.

All trunks are rectangular where they come off the heaters and where they pass through rooms. Through walls they are round pipe as shown in one of the photographs. The branches are also round pipe and

wherever possible were taken off in clusters rather than strung along the run.

A quadrant damper is installed at every branch. Nine hundred square inches of warm air is taken off each heater and 900 square inches of return air is supplied each heater.

The controls consist of a manually operated damper and check. The fans are operated by a bonnet thermostat which turns on the fans at 195 degrees and off at 175 degrees.

The fuel burned in the new system is considerably cheaper than that used originally and consists of a mixture of Pocahontas lump and slack. Heat is up in two hours.

The second system which works satisfactorily was laid out and installed under the direction of J. H. Russell of Ashland, Ohio. The Rybolt Heater Company, Ashland, Ohio, furnished the new equipment.

If you have any comments on this system you are invited to send them along.

The Utility Merchandising Situation

Here are some facts on the fight to take the public utility companies out of the merchandising field. To date thirteen states have passed or are considering legislation prohibiting the utilities from selling merchandise.

Kansas and Oklahoma have definitely passed legislation prohibiting utility merchandising. These laws are in effect.

One state now has legislation requiring the utility companies to account separately for merchandising activities.

There is now before the legislatures of Missouri, California, Nebraska, and Illinois the necessary bills for removing utilities from merchandising.

Not many years ago competition was considered absolutely necessary, but the utility companies have been so wasteful of their money in selling merchandise in order to build load that the situation has become odorous.

No possible excuse exists for these companies to practically give away merchandise in order to profit from its use. The individual contractor cannot hope to meet such competition.

In the heating field, gas and electricity are and will come into increasing popularity during the years. We should exert every effort to control this business.

SIMPLIFIED FACTS FOR GAS EQUIPMENT SALESMEN

By L. W. MILLIS*

Heat Loss of Buildings

PRECEDING information shows you how to calculate heat created by gas and its delivery at the place it is to be used. I will now show how calculations can be made to determine the heat loss of buildings. You can then balance one against the other.

In order to know how much heat (B. T. U.) must be delivered into a building we must know how much heat the building will lose at the difference in temperature required between the inside and outside temperature. Practically every kind and combination of building material has been tabulated showing the heat loss through it for one degree difference between the inside and outside temperature. This factor is called the co-efficient of heat loss for that particular material. It is written C. E. The "Guide" of the American Society Heating and Ventilating Engineers for 1931 has a very complete list of combinations and coefficients. Table No. 3 is reasonably accurate and gives the C. E. for many combinations of building material.

Example

Suppose a building is 25 ft. by 35 ft. by 9 ft. high with 180 sq. ft. of glass (and doors). Walls: 2x4 studing, lath and plaster inside and boxing, paper and siding or sheathing outside. Ceiling: lath and plaster; and an attic under a shingle roof. You want to know how many feet of steam radiation or of hot water radiation or how many square inches of warm air pipe inlet such a room should have. Also how many

cubic feet of (1000 B. T. U.) gas must be introduced into the boiler or furnace to heat the building to 70 degrees in zero weather, assuming only 15 miles of windage.

Such a building will have 1080 sq. ft. of walls. We assumed it had 180 ft. of glass (and doors) which leaves 900 net sq. ft. of wall. It has 7875 cu. ft. of space which will be replaced ordinarily by leakage once per hour. There is 875 sq. ft. of ceiling.

If we assume that the installation of the heating pipes is such that there is only a loss of 25 per cent between the radiator and the nozzle of the boiler or between the canopy of the furnace and the register in the room, the heat required at the nozzle or at canopy collar will be $59811 \div .75 = 79748$ B. T. U. and is called available heat.

If it is a conversion burner job, let us hope the heater will deliver 65 per cent of the heat in the gas at the nozzle or at the collar of the canopy. Then $79748 \div .65 = 122,690$ B. T. U. input.

The cu. ft. of (1000 B. T. U.) gas required per hour would then

be a trifle over 123 during the time such difference of temperature is maintained. In similar manner any building loss, in any climate, with heat distributing equipment of varying efficiencies and heaters giving all sorts of efficiencies can be balanced against any sort of gas from 400 to 1200 B. T. U. value per cu. ft.

There is much good information in Manufacturers catalogs, also there is much that is not fully explained, not to say actually misleading. Care must be exercised in the use of such data.

If you want to go fully into this subject, I suggest study of:

"Simplified Data Sheets for Warm Air Heating." Price 15c. Natural Warm Air Heating Association, Columbus, Ohio.

"The American Society Heating and Ventilating Guide for 1928." Price \$5.00. 29 West 39th St., New York City.

"Industrial Gas Series House-Heating" (Third Edition). Price \$3.00. American Gas Association, 420 Lexington Ave., New York City.

Item No. 5, Table No. 3, gives C. E. .27 per sq. ft. of net wall.
Item No. 66, Table No. 3, gives C. E. 1.22 per sq. ft. of glass.
Item No. 74, Table No. 3, gives C. E. .139 per sq. ft. of ceiling.
Item No. 72, Table No. 3, gives C. E. .02 per cu. ft.

THEREFORE:

900 sq. ft. net wall	×	.27	=	243 B. T. U. loss for 1 degree
180 sq. ft. glass	×	1.22	=	220 B. T. U. loss for 1 degree
875 sq. ft. ceiling	×	.139	=	158 B. T. U. loss for 1 degree
7875 cu. ft. of contents				
(at 1 change per hr.)	×	.02	=	158 B. T. U. loss for 1 degree
Total for one degree.....				743 B. T. U.

743×70 degrees difference = 52010 B. T. U. building loss. If we add 15 per cent for exposures of cold sides the total loss would be 52010 plus 7801 = 59811 total loss. Then $59811 \div 240 = 249$ sq. ft. steam radiation, or $59811 \div 150 = 399$ sq. ft. of water radiation, or $59811 \div 111$ (first story) = 539 sq. in. warm air inlet.

*President, Study Club, Security Stove and Manufacturing Company, Kansas City, Mo.

TABLE 3

Approximate Heat Losses of Various Walls and Roofs
Based on one degree difference between inside and outside, and with a
windage of 15 miles per hour
C. E.—B. T. U. loss per sq. ft. for 1 degree difference for 1 hour.

Symbols

B = 1-in. wooden sheathing.
C = 2x4-in. studding.
D = Wooden lath and plaster.
E = Air space in addition to studding.
F = Bisphoric stucco (furred-out sheathing)
G = Paper.

Index No.	C. E.	Index No.	C. E.
1. Clapboards on C, bare.....	.71	50. 4-in. hollow tile plastered (or stucco).....	.33
2. Clapboards on C, D.....	.50	51. 6-in. hollow tile plastered (or stucco).....	.25
3. Clapboards on C, D. and G.....	.41	52. 8-in. hollow tile plastered (or stucco).....	.20
4. Clapboards on B, C and D.....	.30	53. 4-in. solid concrete or hard stone.....	1.00
5. Clapboards on B, C, D and G.....	.27	54. 6-in. solid concrete or hard stone.....	.85
6. Clapboards on B, C, D and G and sawdust fill.....	.14	55. 8-in. solid concrete or hard stone.....	.71
7. Bevel siding, B, C, D and G.....	.227	56. 12-in. solid concrete or hard stone.....	.60
8. Drop siding, B, C, D and G.....	.227	57. 8-in. solid con. or hard stn. fur. & D & stucco out.	.246
9. Wood shingles, B, C, D and G.....	.228	58. 12-in. solid con. or hard stn. fur. & D & stucco out.	.22
10. Wood shingles, B, C, inside sheath, D, and G.....	.122	59. 8-in. hollow concrete blocks ½-in. plaster on mas.	.348
11. Bevel Siding, Gyp-lap, sheathing, C, D.....	.25	60. 12-in. hollow concrete blocks ½-in. plaster on mas.	.271
12. Bevel Siding, masonite sheathing, C, D.....	.202	61. Galvanized siding flat on common frame.....	1.20
13. Bevel Siding, insulite sheathing, C, D.....	.196	62. If corrugated siding flat on com. frame add 1/5)....	1.44
14. Bevel Siding, B, D, Gypsum plaster on gypsum bd.	.236	63. Wood sash windows and skylights, single glass.....	1.13
15. Bevel Siding, B, C, Gypsum plaster on masonite bd.	.236	64. Wood sash windows and skylights, double glass.....	.45
16. Bevel Siding, B, Gypsum plaster on insulite base....	.179	65. Solid metal sash windows and skylights, sin. glass..	1.30
17. F, B, C, D.....	.234	66. Glass SURFACE ONLY single.....	1.22
18. Stucco over wool ath exterior, C, D.....	.286	67. Glass SURFACE ONLY double.....	.80
19. Wood siding gyp. sheath., C, gyp-plaster on gyp. bl.	.280	68. <i>Thin panel doors same as single glass sash.</i>	
20. Bevel siding masonite sheath., C, gyp-pl. on masonite	.168	69. 1-in. wooden doors.....	.56
21. Bevel siding insulite sheath., C, gyps-pl. on insulite	.161	70. 1¼-in. wooden doors.....	.48
22. Stucco exterior, B metal lath in. and out. and stucco	.255	71. Window perimeters, leak about 1 cu. ft. per hour....	.016
23. Stucco exterior on metal ath, C, stucco in. and out.	.318	72. 1 cu. ft. of air per hour (use .02).....	.016
24. Bevel siding, B, C, gypsum wallboard inside.....	.239	73. Ceiling, D, no floor and wood shingles on strips.....	.224
25. If gypsum fill or sawdust or flaxlinum (or similar insulation is used between studs) deduct.....	.10	74. Ceiling, D, attic and wood shingles on strips.....	.139
26. Brick veneer, 4-in., G, B, C, D.....	.261	75. Ceiling, D, no floor, composition shingle on sheath.	.231
27. Bevel siding, B, C, flaxinum, D.....	.133	76. Ceiling, D, attic, composition shingle on sheath.....	.141
28. Bevel siding, B, C, balsam wool, D.....	.125	77. Ceiling, D & board insulation, no floor, composition shingle on sheathing.....	.091
29. Bevel siding, B, C, Cabots quilts, D.....	.137	78. Ceiling, D & board insulation, attic floor, composi- tion shingle on sheathing.....	.073
30. 8-in. plain brick wall.....	.31	79. Ceiling, D and gypsum fill, attic floor, composition shingle on sheathing.....	.079
31. 13-in. plain brick wall.....	.25	80. Asbestos shingles B can be substituted for composition.	
32. 18-in. plain brick wall.....	.20	81. Slate or tile and roofing felt same as composition of asbestos on B.	
33. 9-in. plain brick wall plaster on brick one side.....	.27	82. No ceiling, rafters exposed wool shingle on strips....	.483
34. 13-in. plain brick wall plaster on brick one side.....	.22	83. No ceiling, rafters exposed wool shingle on sheath.	.41
35. 9-in. plain brick wall with air space and D.....	.20	84. No ceiling, rafters exp. comp. or asbestos on sheath.	.518
36. 13-in. plain brick wall with air space and D.....	.17	85. No ceiling, rafters exp. slate or tile on sheathing....	.549
37. 18-in. plain brick wall with air space and D.....	.14	86. No ceiling fiber ins. and any of above and plaster....	.118
38. 4-in. brick and 4-in. concrete (8-in.).....	.36	87. No ceiling, most any soft ins., any of above and pt.	.10
39. 4-in. brick and 9-in. concrete (13-in.).....	.30	88. Corrugated iron on strips.....	1.75
40. 4-in. brick and 4-in. concrete and plastered one side	.32	89. Corrugated iron on sheathing.....	.62
41. 4-in. brick and 9-in. concrete and plastered one side	.27	90. Tin on strips.....	1.20
42. 4-in. brick and 4-in. concrete furred and D.....	.21	91. Tin on sheathing.....	.60
43. 4-in. brick and 9-in. concrete furred and D.....	.19	92. Shingles on sheathing.....	.41
44. 4-in. brick and 4-in. hollow tile (8-in.).....	.26	93. 1-in. wood with 5 to 8 ply paper tar and gravel.....	.30
45. 4-in. brick and 6-in. hollow tile (10-in.).....	.23	94. 2-in. wood with 5 to 8 ply paper tar and gravel.....	.21
46. No Allowance for Crackage.		95. 3-in. reinforced concrete with tar and gravel.....	.61
47. 4-in. brick and 4-in. hollow tile plastered.....	.27		
48. 4-in. brick and 8-in. hollow tile plastered.....	.228		

Electric Motor Requirements In Modern Heating [Part II]

By H. WEICHSEL

Consulting Engineer, Wagner Electric Corp., St. Louis

But why all this discussion about air humidity? The answer lies in the physical make-up of the human body. The purpose of all heating is to keep the human body comfortable. Tests and experience have shown that the comfort of the human body depends neither only on the air temperature indicated by the dry bulb nor only on the wet bulb thermometer, but has a certain relation to both. In other words, the comfort of the human body depends on the relative humidity and the dry bulb thermometer temperature reading. Tests have shown that the average person experiences the same sensation of warmth under the following combinations of temperature and humidity at a given rate of air motion.

Dry Bulb Temperature	Relative Humidity
80 deg.....	12 per cent
75 deg.....	38 per cent
70 deg.....	73 per cent
67 deg.....	100 per cent

All of these combinations of conditions are classified arbitrarily as being of the same effective temperature, that is to say, they create the same sensation in the human body. In the above example, the effective temperature is 67 degrees.

The effective temperatures have been plotted in Fig. 11 in combination with grains of moisture per pound of dry air and relative humidity. This figure has many points in common with Fig. 10A, except that the lines of the wet bulb thermometer readings have been omitted and in their place are plotted the values of effective temperature. The line of maximum

In this second article and the one to follow, a brief discussion is given of air conditions which are encountered when a fan is installed in a warm air system. With this groundwork, the author will be ready to relate fundamental principles of electric motor construction

comfort is the 64 deg. effective temperature line. The limit of human comfort occurs at about 69 deg. F. and 62 deg. F. effective temperature. Beyond these limits, the aver-

age person begins to show signs of discomfort.

The same may be shown in a somewhat simpler diagram, Fig. 12. The charts just referred to have been made up for comparatively still air. If the velocity of the air is increased, the result is that the effective temperature line becomes more horizontal in Figs. 11 and 12. It would be found that the same conditions of comfort for a given dry bulb temperature reading exists for a higher relative humidity than shown on these charts.

The reason for all this is to be found in the fact that the human body keeps its temperature constant at 98.6 deg. F. and produces hourly 400 B.t.u. These B.t.u. have

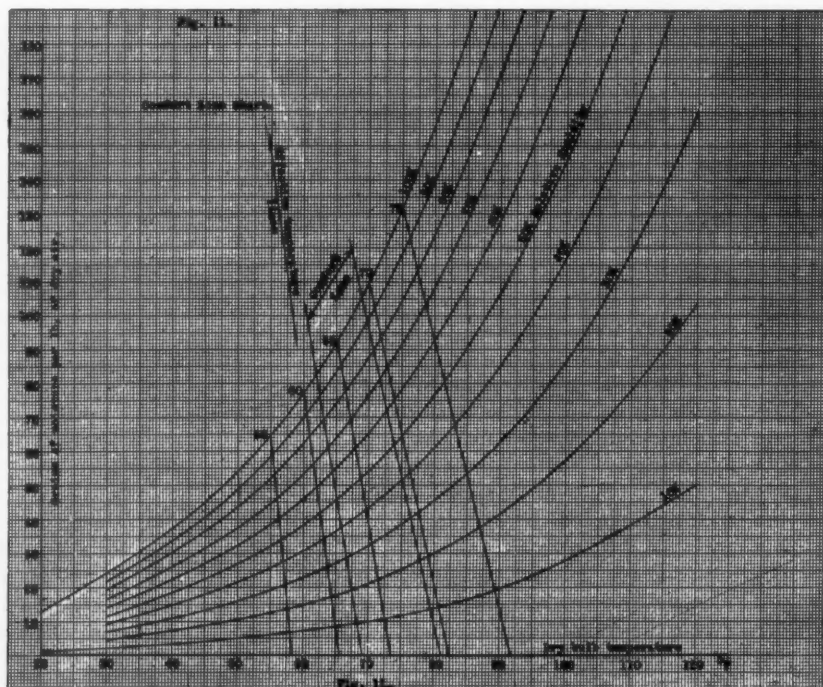


Fig. 11—This is a modified Comfort Chart on which effective temperatures, that is temperatures agreeable to the human body, are plotted in combination with the number of grains of moisture per pound of dry air and relative humidity. The line of maximum comfort is the 64 degree line

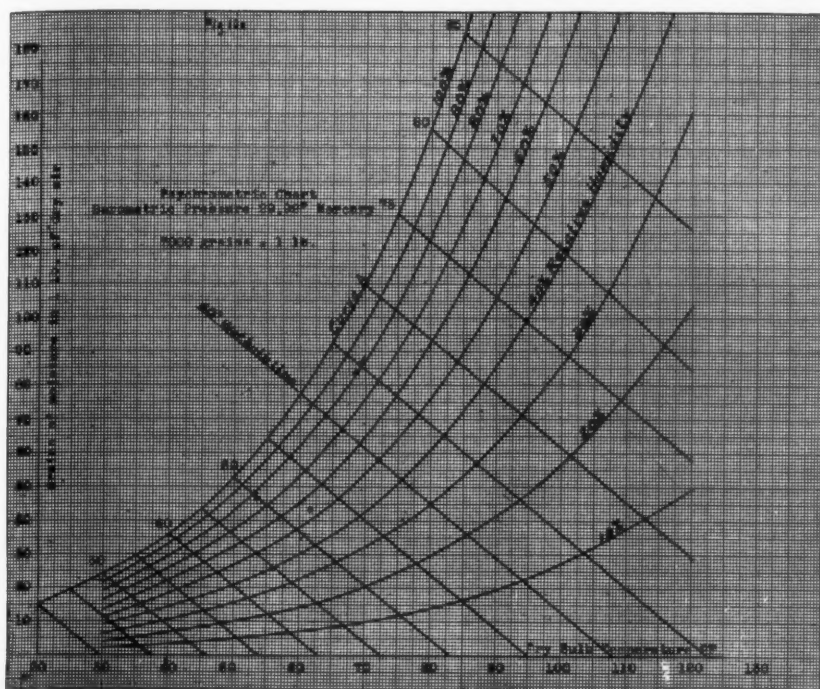


Fig. 10A—This chart is similar to Fig. 11 except that the lines of the wet bulb thermometer readings are included. These lines hold true only in still air. Moving air changes these readings materially

to be given up to the surrounding air at such a rate that the body temperature remains 98.6 deg. F. The body gets rid of these 400 B.t.u. by three means:

1. Heat conduction.
2. Heat radiation.
3. Evaporation.

The last mentioned means is the most important, and it is readily seen that evaporation is more pronounced the lower the air humidity and the higher the dry bulb temperature and the larger the air velocity.

To conceive more clearly the fact that the body dissipates 400 B.t.u. per hour or 6.6 B.t.u. per minute, we can translate these figures into the temperature rise which the body would give to let us say 30 cubic feet of air. As one B.t.u. raises 55 cubic feet of air one deg. F., it follows that 400 B.t.u. in an hour are equal to 12 deg. rise per minute in 30 cubic feet of air. In other words the human body raises the temperature of 30 cubic feet of air surrounding it by 12 deg. F. in one minute. As this would exceed the body temperature materially, it is readily seen that a heavy evaporation takes place.

If a house has its walls, roofs, and floors constructed with a material which is a perfect heat insulator, the only heat necessary to bring the room temperature to a desired value, say 70 deg., is the heat necessary to raise the cubical air content of the house from the original temperature, let us say

zero deg., to a comfortable temperature, let us say 70 deg.

Suppose the house has a cubical content of 55,000 cubic feet and the outside temperature is zero deg. F. The air in the house is to be raised to a temperature of 70 deg. F. Then

$$\frac{55,000}{55} \times 70 = 70,000 \text{ B.t.u.}$$

are required, and it would make no difference if these 70,000 B.t.u. are added to the air in one minute, one hour, or in one day.

After they have been added, the air temperature would be 70 deg. F., and this temperature would remain indefinitely. In other words, one heating would keep the house comfortable during the whole winter season. This would be an ideal house. Unfortunately, the materials used in building the house are far from perfect insulators, and they transmit a relatively large amount of the heat inside of the room to the surrounding outside atmosphere.

The amount of heat which can be transmitted through a square foot of the material with one degree temperature difference is called the coefficient of transmission. Laboratory tests have been made to

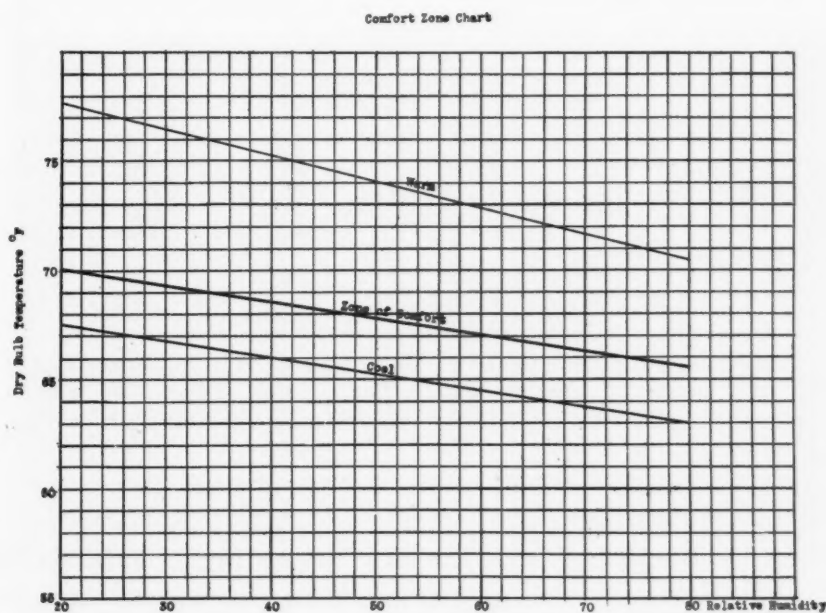


Fig. 12.

Fig. 12—This is a simplified chart showing the same data as Figs. 10A and 11. The Zone of Comfort is here plotted as a single line. Read along this line from temperatures shown at the left and down to the relative humidity which gives the most comfort

determine this coefficient for most building materials. Typical results of experimental tests carried out on this matter are given in Fig. 14.

Besides the transmission of heat from the inside air to the outside air through the walls, floors, roofs, etc., there is a certain leakage of the cold outside air into the rooms. Such an air leakage occurs for instance through the windows or the doors and particularly when the doors and windows are opened. On a quiet day, it is generally assumed that the air leakage in one hour or "infiltration" amounts to the total cubical contents of the house.

If a heavy wind beats on the windows, it is evident an increased infiltration must take place.

Knowing the constants of air transmission and air leakage, it is an easy matter to determine the B.t.u. which hourly must be sent into the building in order to keep the air content at a predetermined

value, let us say, 70 deg. An example of such a calculation is given in Fig. 16.

From this calculation it will be seen that a remarkable similarity exists between the method of cal-

culating the hourly B.t.u. requirements of a building whose air content is to be kept at a definite temperature and the calculation of an electric machine whose temperature rise should not exceed a certain

Surface	Sq. Ft.	B.T.U. Constant	B.T.U. per Hour per Deg. Diff.	Temperature Difference	Total B.T.U. per Hour
Walls					
Glass	2093	1.1	2302		
8" brick	3674	.38	1388		
12" brick	4614	.29	1338		
#18 gage steel doors	64	1.3	83		
Floor					
Cement wood covered	20800	.12x30 60	1248		
Roof					
#18 gage steel with #14 asbestos roofing	21944	.94	20637		
Monitor					
Glass	1300	1.1	1430		
#18 gage cor. steel	231	1.5	346		
Total B.T.U. per degree temperature difference			28772	60°	1,726,320
10% Factor of Safety					172,632
Total B.T.U. required for radiation					1,898,952
Infiltration - one complete change per hour					
470,496 cu. ft. x 60°					
55.2					511,408
Total B.T.U. required per hour					2,410,360
One B.T.U. will raise temperature of 55.2 cu. ft. of air 1° F.					

Coefficient of Heat Transmission or B.T.U. Constant

B.T.U. Transmitted per hour thru
1 sq. ft. of surface with 1° F
temperature difference

Material	B.T.U. Coefficient
Window glass	1.1
8" brick wall	.38
12" brick wall	.29
18 U.S.G. steel door	1.3
18 U.S.G. corrugated steel	.94
Concrete floor with wood covering above	.12
Asbestos roofing	.94

Fig. 14—Here are shown a few of the hundreds of established coefficients of heat transmission for commonly used building materials. Similar coefficients have been established to cover every conceivable type of exterior surface

Above—Fig. 16—This simplified data sheet shows how the heat loss of typical exterior surfaces are worked into the number of B.t.u.'s lost per hour per degree temperature difference. Below these losses are totaled for a temperature difference of 60 degrees to give the heat loss of a building

value for a given watt loss. In the heating plant, we deal with B.t.u. per hour and cooling surface expressed in square feet, and in electric equipment we speak as a rule of watts instead of B.t.u. per hour and cooling surface in square inches instead of square feet as used in heating calculations. The principle of calculation, however, is entirely identical. The only difference in the two calculations lies in the units of energy and units of cooling surface used.

This article and the one preceding, establish the limitations of the field the author proposes to discuss in later issues. With the next issue Mr. Weichsel will begin the discussion of the application of fans to the warm air heating field. Questions of readers are invited.

Aire-Flo Code

A New Forced Air System

By **JOHN W. NORRIS**
Lennox Furnace Company

THE air conditioning idea is sweeping the country—and the furnace dealer is doing his level best to keep up with the demand. As a matter of fact, the forced air idea has wrought more change in the heating industry in the past two years than we have seen in any previous twenty years.

The situation has reached the point where the public is beginning to ask about air conditioning, real estate and home developers are inquiring into its sales possibilities, and the man contemplating remodeling is interested in installing this new type heating system.

The unfortunate thing about this situation to date is that too few heating contractors have been able to make money from air conditioning. This is due in part to a lack of knowledge of the principles which must be understood, also to a lack of information on the labor and material costs essential for a profit. Too many trunk line installations have cost the contractor money, when he should have made a nice profit.

But forced air and air conditioning are basically sound. There is a marvelous future for the dealers and their manufacturers who go after this entirely new market in the right way. It would seem, however, that forced air work will not enjoy the lasting popularity to which it is entitled until the figuring and the installation of such systems is simplified so as to bring it within the province of the average mechanic, or until engineering knowledge is widely and thoroughly understood. Of the two possibilities the first—the simplified system—seems right now to possess the greatest possibilities.

With these ideas in mind, the Lennox Furnace Company some years ago commissioned its engineering department to investigate the possibilities of forced air heating and ascertain what simplification procedures might be worked out so that the contractor stood a better chance of making money from this class of work.

The result of this engineering investigation is a new system departing radically from present practice in many ways, but establishing new methods of figuring and installing forced air jobs. This system has been named the Aire-Flo Code.

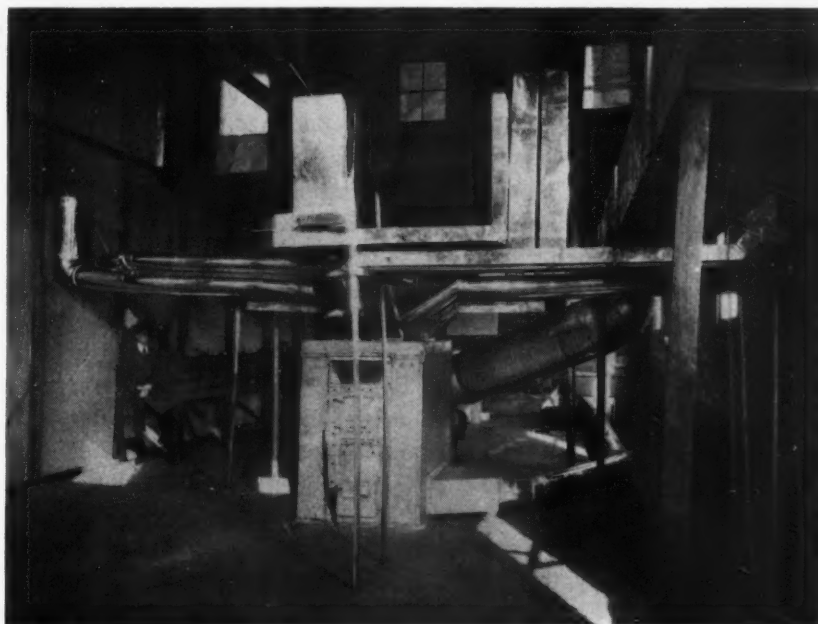
In order to understand what this new system is and how it differs from customary practice, it is necessary to review briefly some of the established heating facts.

In the first place the contractor must decide whether he will install a forced air system or a mere

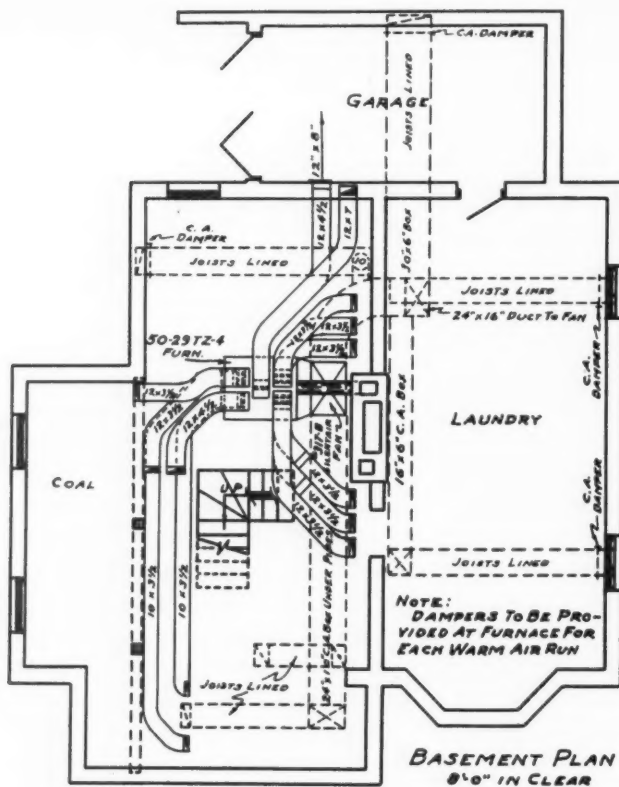
booster job. It should be remembered that there is no such thing as a good combination fan and gravity system in a two-story residence. If the dampers are set for proper heat distribution with the fan operating, it will be clear out of balance for gravity. Likewise, if dampers are set for proper gravity operation the whole job will be upset when the fan starts.

The reason for this is simple. Gravity circulation depends upon the temperature difference between warm and cold air and the height of the warm air opening. The higher the riser pipe, the faster the air travels through it—just like the higher the chimney, the better the draft. It is for this reason that we use the multiplying factor of 6 in the Standard Code for second floor pipe sizes, 9 for first floor and 5 for third floors.

The operation of a fan system is



One of the experimental set-ups in the laboratory of the Lennox Furnace Company, Marshalltown, Iowa. Both round pipe and rectangular stack were used. Tests were run to discover the carrying capacity of both types of pipe. The long, round pipe along the floor connects with the blower



entirely different. The fan creates a positive mechanical pressure in the furnace casing—a pressure which is independent of the height (or chimney effect) of the warm air pipes. This pressure forces air out of the nearest and easiest openings.

The gravity installation has first floor pipes that are 50 per cent larger than second floor pipes for rooms of the same heat loss. If a fan is added to a gravity job, over 75 per cent of the heat will be forced to the first floor where the pipes are not only the largest but are also the shortest. The second floor will be cold.

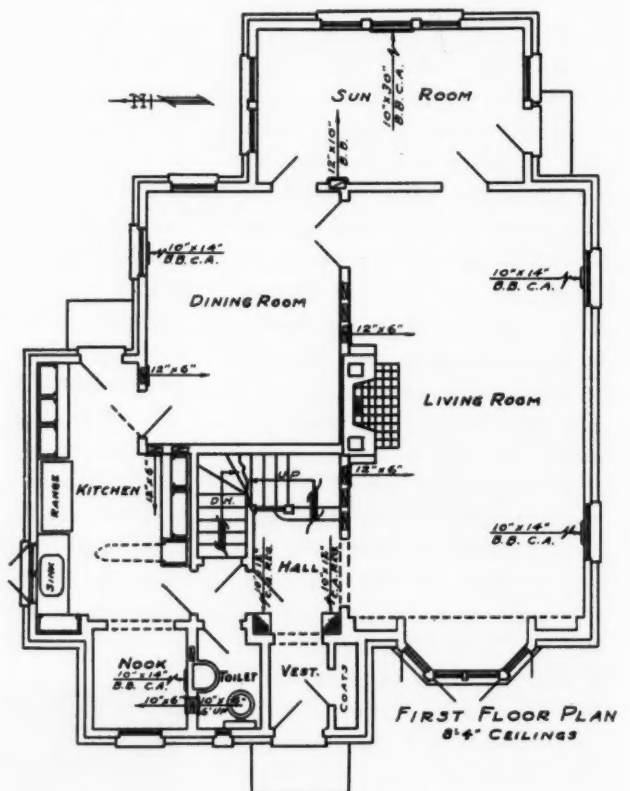
When you dig right down to the basic principles of warm air engineering there is no such thing as a well balanced combination fan and gravity system—it will either be balanced one way or the other but not both—and usually it is not well balanced for either type of operation.

The first radical departure made in the Aire-Flo Code was the adoption of individual runs of pipe in place of the customary trunks or ducts with branches.

At first this might seem like a step backward because we have been trying to get away from the

Left—This is a test residential set-up. Notice how the rectangular stacks are taken off the flat bonnet in groups and run on top of one another to conserve basement space. Each room is supplied by an individual run. Return air is taken from all sides

This is the plan showing the arrangement of registers and grilles on the first floor. All return air is taken from outside walls



from every warm air opening back to the furnace.

The individual pipe installation does away with much of the mechanical difficulties encountered on trunk line systems. It is easy to install and the air distributes evenly. In the third place, it is easier to balance the system. Dampers are used in each pipe. If one of these dampers should be turned the rest of the pipes will not be thrown out of balance as often happens when one volume damper in a trunk line is turned.

gravity idea which usually took individual pipes. As a matter of fact, this is a step forward.

With the fan system these individual pipes are very much smaller than gravity pipes. Almost eight out of every ten pipes will be 12x 3½ in. Standard fittings can be used and any mechanic who ever installed a good gravity system can put together an individual pipe system.

All leaders are made in riser pipe sizes. As these are taken from the top of a flat top hood they can be bunched together so they appear very much as a trunk line even though the individual run extends

The system also employs a different system for figuring proper pipe sizes—an adaptation of the Standard Code—but using the factor 5 for all floors instead of 9 for the first floor, 6 for the second and 5 for the third.

The factor 5 was selected because it results in an area less than 42 sq. in. (a 3½x12 riser) to the average second floor bedroom. Naturally, it would not be practical to install systems that call for more pipe area than one normal riser to the average bedroom.

In other words, the normal second floor room is the limiting factor. If the house has unusually

ROOMS	ROOM DIMENSIONS	CUBICAL CONTENTS	EXPOSED			GLASS Div. by 12	WALL Div. by 68	CEILING Div. by 20	CU. CON. Div. by 800	TOTAL x 5	LEADER AREA	AREA REQUIRED	PIPE SIZE USED	AREA USED
			Glass	Wall	Ceiling									
LIVING	26x14 $\frac{1}{2}$ x8 $\frac{1}{2}$	3204	92	275	—	7.7	4.1	—	4.0	15.8	79.0		2-12x3 $\frac{1}{2}$	84
DINING	15x11 $\frac{1}{2}$ x8 $\frac{1}{2}$	1466	28	105	—	2.3	1.6	—	1.8	5.7	28.5		12x3 $\frac{1}{2}$	42
KITCHEN	15x9x8 $\frac{1}{2}$	1148	30	186	—	2.5	2.7	—	1.4	6.6	33.0		12x3 $\frac{1}{2}$	42
SUN	9 $\frac{1}{2}$ x16x8 $\frac{1}{2}$	1292	89	204	152	7.4	3.0	3.0	1.6	15.0	75.0		12x7	84
NOOK	6x6x8 $\frac{1}{2}$	306	14	86	—	1.2	1.3	—	0.4	2.9	14.5		10x3 $\frac{1}{2}$	35
TOILET	4x6x8 $\frac{1}{2}$	204	3	28	—	0.3	0.4	—	0.3	1.0	5.0			
HALL	5x11x8 $\frac{1}{2}$	468	28	55	—	2.3	0.8	—	0.6	3.7	18.5		12x3 $\frac{1}{2}$	42
"	9x13 $\frac{1}{2}$ x8	972	—	—	121	—	—	1.4	1.2	2.6	13.0			
BED #1	14 $\frac{1}{2}$ x10x8	1160	30	162	145	2.5	2.4	1.6	1.5	8.0	40.0		12x3 $\frac{1}{2}$	42
" 2	14 $\frac{1}{2}$ x12x8	1392	28	182	174	2.3	2.7	1.9	1.7	8.6	43.0		12x3 $\frac{1}{2}$	42
" 3	12x12x8	1152	34	150	144	2.8	2.2	1.6	1.4	8.0	40.0		12x3 $\frac{1}{2}$	42
" 4	9 $\frac{1}{2}$ x16x8	1216	42	166	152	3.5	2.4	1.7	1.5	9.1	45.5		12x4 $\frac{1}{2}$	54
BATH	9x5x8	360	12	100	45	1.0	1.5	0.5	0.5	3.5	17.5		10x3 $\frac{1}{2}$	35
GARAGE	16 $\frac{1}{2}$ x8 $\frac{1}{2}$ x8	1122	64	130	—	5.3	1.9	—	2.0	9.2	46.0		12x4 $\frac{1}{2}$	54
99.7 x 1000 = 99,700 B.T.U. TOTAL											99.7			598
+10% = 9,970 "														
TOTAL = 109,670 "														

Total (A) x 1000 = B.T.U. (Without Exposure)

Add (10%) Exposure = 109,670 B.T.U. Required of Furnace

With Gas Furnaces add 25% to B.T.U. to get Furnace Size.

C.F.M. at 140° Register Temp. = B.T.U. x .0122

C.F.M. = 109,670 x .0122 = 1338

Blower No. 317-B SILENTAIR

*CEILING FACTOR 50 USED

*CUBICAL CONTENTS FACTOR 600 USED

*Table A—See Reverse Side

COLD AIR Room	COLD AIR Face	PIPE	
		Dim.	Area
LIV. SUN & DIN.	24x16	PIPE	384"
BKFT			
HALL	24x10	"	240"
			624"

SUMMARY	
Actual Requirement (Pipe Area) (B.T.U.)	109,670
Furnace No. 50-29 Cap.	120,000
Warm Air Pipe Used	598"
Cold Air Pipe Used	624"

This is the data sheet for the house set-up. It is modified Standard Code. Heat loss coefficients are standard. Notice, however, that the factor 5 is used for all floors. The text explains this point. Notice also that total B.t.u. heat losses are expressed in terms of 1,000 B.t.u.'s

large second floor rooms then it might be necessary to use the factor 4 instead of 5 in order to come out with a pipe area within the size of a single riser. By using the same multiplying factor for all floors we deliver air at approximately the same velocity to all warm air outlets.

The data sheet shown in Fig. A simplifies the figuring of this system. It is interesting to note that the figures in the "total" column express B.t.u. heat losses in terms of 1000 B.t.u.'s. As shown in the lower left-hand corner you can find the B.t.u. heat losses from the entire house by multiplying the "Total A" by 1000. This figure, with an exposure correction, is used in specifying the proper furnace size.

As you will see by the sample job figured in the data sheet, riser pipe sizes are used throughout. It is not practical to run single riser pipe in the basement. This material is too flimsy and would make necessary a lot of soldering. Furthermore, standard riser angles, elbows and offsets have square corners

which make them unattractive when exposed in a basement.

To simplify Aire-Flo systems the Lennox Furnace Company is now making for its dealers a special line of galvanized Aire-Flo fittings. These are made in the following sizes — 10x3 $\frac{1}{2}$ -in., 12x3 $\frac{1}{2}$ -in., 12x4 $\frac{1}{2}$ -in., 12x5 $\frac{1}{2}$ -in. and 12x7-in.— with all necessary elbows, angles, offsets and hood collars. The pipe is made in 5-ft. lengths. The angles, elbows, etc., are made with sweeping curves instead of square corners.

In order to explain how a job is figured study the floor plans shown in Figs. B, C and D. Then study the data sheet to see how the pipe sizes were determined. From the appearances of the basement plan the pipe sizes may seem large and awkward. As a matter of fact, these are all small, flat pipes which fit snugly against the ceiling where they are very inconspicuous. Notice that in some cases we come off the flat top hood with three pipes, one on top of the other. As first one pipe and then the other is turned

up into the house the remaining pipes are brought up tight against the ceiling where they are completely out of the way.

We have tried to eliminate all uncertain factors. For instance, the additional factor for special exposures. There are so many variables in the average job that few installations are so perfectly balanced that a definite correction exposure can be established. In Aire-Flo Code we recommend figuring area without exposure. Then if the run is long to the windy side use a size larger pipe. If the run is short and direct use a size smaller. In other words, horse sense, added to the practical knowledge every heating man should have, will satisfy theory in most cases.

Take the case of the pipe leading to the nook and toilet. 22-in. is required. We have specified a standard 3 $\frac{1}{2}$ x10-in. pipe giving a total of 35 in. Likewise, the second floor bathroom has a 3 $\frac{1}{2}$ x10-in. pipe even though 20-in. is required. Notice that these are the longest pipes on the job. These rooms are

also on the exposed side of the house. By using the full 3½x10-in. pipe you are assured of ample heat and can use standard fittings throughout.

Our tests and installations have shown that distribution of heat is excellent in this system, even without turning any dampers. We have also found that when the fan is idle a goodly circulation by gravity takes place. For example, on one installation where the set up consists of 518 in. of warm air pipe and 610 in. of cold air, air circulation with the fan running was ap-

proximately 1400 c.f.m. and with the fan idle 600 c.f.m. Of course most of this heat went to the first floor. On this job a centrifugal blower was used and there were no bypass dampers. Circulation was through the cage.

One of the most surprising results developed in the tests was the small amount of static resistance encountered. When the engineer first analyzes an individual run job he jumps to the conclusion that it offers more static resistance than a trunk line system. As a matter of fact, the reverse is the case.

The installation shown in Figs. B, C and D offered a static resistance of .065 in. without an air washer and .080 in. with an air washer between fan and furnace.

From this it is safe to state that houses with a total heat loss under 110,000 B.t.u.'s will offer a static resistance in an Aire-Flo system of approximately 1/16 in. Houses from there up to a heat loss of 175,000 B.t.u.'s will offer approximately 1/8 in. static. From there to 250,000 B.t.u.'s will offer approximately 3/16 in. Larger buildings will run from 1/4 in. to 3/8 in.

Stamped Bronze Sheetting Saves Weight on Elevator Doors

EMBOSSED bronze sheeting giving the appearance of solid bronze doors have been successfully applied to the elevator doors in the main lobby of the Financial Center Building, Oakland, Calif., by the Forderer Cornice Works of San Francisco. The use of the sheet metal permitted a reduction in weight of more than 300 pounds per pair of doors over the original plans, resulting in less strain to the door operating mechanisms, as well as cutting the cost of the doors in half.

The metal was made up similar to the usual method of stamping cornices. Forderer made a model of the design from drawings and shaped a zinc dye from the model. Four sets of doors were embossed from the dye. The sheets were then acid treated for color effects. Each sheet was applied to the steel door structure with concealed fasteners.

The design used on the sheet metal doors is highly ornamental. The sheet metal contractor made the mold from drawings and used a zinc die to stamp the sheets. It was possible to stamp four doors with this die

(Photo by Gabriel Moulin)



CAN YOU TELL ME?

"V" Belt Three Speed Pulley

From Etie Sheet Metal Works, Houston, Texas.

Where can we get a "V" belt pulley that can be changed from one to three speeds?

Ans.—The Delta Manufacturing Company, 1661 Holton Street, Milwaukee, Wis.

Seamless Steel Tubing

From Bongard Sheet Metal Works, El Dorado, Kansas.

Where can we get seamless steel tubing?

Ans.—National Tube Company, Frick Building, Pittsburgh, Pennsylvania; Timken Roller Bearings Company, Canton, Ohio; Youngstown Sheet & Tube Company, Youngstown, Ohio.

Oil Can Faucets

From L. C. Noland, Salem, Oregon; Pacific Metal Company, Portland, Oregon.

Where can we get oil can faucets?

Ans.—General Brass Company, 100-146 Campbell Avenue, Detroit, Michigan; Marsh Manufacturing Company, 122 William Street, New York City; Steel Drum Accessories Corporation, 286 Mills Street, Buffalo, New York.

Copper Kettle

From A. G. Schroeder, Ironwood, Michigan.

Where can we get prices and information on 30-gallon tinned on inside copper kettles with bail as used in the manufacture of candy?

Ans.—Brighton Copper Works, 2832 Spring Grove Avenue, Cincinnati, Ohio.

Wood Burning Furnaces

From Herman Brunner, New Haven, Missouri.

Where can we get a wood burning furnace?

Ans.—Keith Furnace Company, Des Moines, Iowa; Lennox Furnace Company, Marshalltown, Iowa; The Meyer Furnace Company, Peoria, Illinois; L. J. Mueller Furnace Company, Milwaukee, Wisconsin; Ramey Manufacturing Company, Columbus, Ohio.

"Arex" Ventilator

From Leonard Snowden, Macomb, Illinois.

Where can we purchase an "Arex" ventilator?

Ans.—Arex Company, 333 North Michigan Avenue, Chicago, Illinois.

Dust Collectors for Shoe Shop

Machinery

From O. A. Bjorgan, San Francisco, California.

Where can we get dust collectors for shoe shop machinery?

Ans.—American Blower Company, 228 North La Salle Street, Chicago, Illinois; Autovent Fan & Blower Company, 1807 North Kostner Avenue, Chicago, Illinois; Bayley Blower Company, 780 Greenbush Avenue, Milwaukee, Wisconsin; The Brundage Company, Kalamazoo, Michigan; Buffalo Forge Company, 17 North Jefferson Street, Chicago, Illinois; Alfred C. Goethel Company, 829 31st Street, Milwaukee, Wisconsin; Kirk & Blum Manufacturing Company, 2845 Spring Grove Avenue, Cincinnati, Ohio; B. F. Sturtevant Company, 18 Damon Street, Hyde Park, Boston, Massachusetts.

Spot Welding Equipment

From H. Sabathne & Son, Altoona, Pennsylvania.

Who manufactures spot welding equipment?

Ans.—Federal Machine & Welder Company, Dana Avenue, Warren, Ohio; Joseph T. Ryerson & Son, 2558 West 16th Street, Chicago, Illinois; The Taylor-Winfield Corporation, 12 Atlantic Street, Warren, Ohio.

Steel Wool for Air Filters

From Merle P. Durren, Dowagiac, Michigan.

Where can I get steel wool for air filters?

Ans.—American Steel Wool Manufacturing Company, 9 Desbrosses, New York City; Galvin Brothers Steel Wool & Manufacturing Company, 3500 South Morgan Street, Chicago, Illinois; International Nickel Company, Inc., 67 Wall Street, New York City (monel metal wool); International Steel Wool Company, Springfield, Ohio; James H.

Rhodes & Company, 157 West Austin Avenue, Chicago, Illinois.

Repairs for the Blue Bird Washer

From H. S. Garrigus, North East, Pennsylvania.

Where can we get parts for the Blue Bird Washer?

Ans.—The Taylor Washing Machine Company, 4051 West Madison Street, Chicago, Illinois.

Repairs for Arcadian Malleable Steel Ranges

From Roanoke Hardware Company, Roanoke, Illinois.

Where can we get repairs for the Arcadian Malleable Steel Range?

Ans.—Northwestern Stove Repair Company, 662 West Roosevelt Road, Chicago, Illinois.

Stokers for Soft Coal

From G. O. Crouch & Son, Chattanooga, Tennessee.

Who manufactures stokers for soft coal?

Ans.—Brownell Company, Dayton, Ohio; Combustioneer, Inc., Goshen, Indiana; Detroit Stoker Company, General Motors Building, Detroit, Michigan; Ever-Ready Coal Burner Company, 209 East Baltimore Avenue, Detroit, Michigan; Fire-King Stoker Company, 1160 Roosevelt Road, Indianapolis, Indiana; Parry Stoker Company, Cincinnati, Ohio; Uniflow Stoker Company, Sidney, Ohio.

Retinning

From J. V. Patten Company, Sycamore, Illinois.

Where can we get equipment for retinning milk cans?

Ans.—Hopwood Retinning Company, Chicago Heights, Illinois; Retinning Manufacturing Company, 3021 Greenview Avenue, Chicago, Illinois.

Estimate and Cost Forms

From Schlafer Hardware Company, Appleton, Wisconsin.

Where can we get samples of estimate and cost forms to be used in connection with our work?

Ans.—National Association of Sheet Metal Contractors, 429 Fourth Avenue, Pittsburgh, Pennsylvania.

NEW ITEMS and NEWS ITEMS

From and about the Manufacturers and Jobbers

Northern Oil Burners, Inc. Succeeds Northern Oil Burner Co.

Having recently purchased the patents, good will and other assets of the Northern Oil Burner Company, which has operated for the past seven years with factory and general office in Minneapolis—a new organization is taking over the manufacture, sales and installations of the Northern Automatic Oil Burner and the Northern Junior Oil Heater.

The new organization, Northern Oil Burners, Inc., is headed by Harvey E. Mack, president, and George M. Craig, Executive Vice-President and Secretary. New factory and general sales offices are now established at 2441 Hennepin Avenue, Minneapolis, Minnesota.

The Northern Junior Oil Heater becomes a companionate product of the Northern Automatic Oil Burner. Although the Junior Oil Heater is a smaller and a portable, self-contained unit, similar in basic design to the Northern Automatic Oil Burner, it is specially adapted to every localized need, such as summer cottages, hunting lodges, brooder houses, filling stations, home garages and innumerable other uses.

J. V. Patten Co. Making New Superheater

The J. V. Patten Company, Sycamore, Ill., now have ready for contractors a new heater known as the Patrola. This unit was brought out to be used in rural schools. The heater is being made in three sizes—18-, 20- and 23-inch grate area.

The heater itself is all steel construction made of 10 gauge copper bearing steel with fire brick lining. The jackets are made amply large and are finished in a beautiful marbled vitreous enamel. Standard equipment with these heaters includes fresh air intake and ventilating equipment so that it becomes a complete heating and ventilating unit. The 23-inch size is the largest square type heater that is on the market at the present time.

The company claims that this new heater is exceptionally attractive; provides a uniform, healthful heat; ventilates perfectly, and gives the proper humidity. It is also said to heat quickly and operate easily. It will burn any fuel. The casing cannot be scratched or marred.

Silent Automatic Corp. Launches Sales Effort

Evidencing its faith in the upswing of the general business curve—and in the resulting renewed activity in the home and apartment building field—the Silent Automatic Corporation, of Detroit, has launched a greatly enlarged advertising program, directed both to the general public and to builders and architects.

In all of its direct factory retail branches, located in important metropolitan centers, there is a special department of the sales organization which devotes its time exclusively to the assistance of builders and architects in the selection of the best heating equipment for new homes and apartment buildings.

Interlock Flashing Corp. Marketing New Flashing

Interlock Flashing Corporation, 308 West 20th Street, New York City, now has ready for market a complete line of flashing. The line contains flashings for over lintels and cornices, base flashing, and for under copings, sills, cornices, etc.

A leaflet showing the line, with descriptions and details, may be had from the company.

Williamson Heater Co. Elects New Officers

W. C. Williamson of The Williamson Heater Co., Cincinnati, Ohio, has been elected president of that company to succeed his brother, A. W. Williamson, who died recently. Mr. W. C. Williamson has been associated with the company as secretary for more than thirty years.

Other officers, all of whom have served with the company for many years, are as follows:

W. L. McGrath, vice-president.

E. O. DeCamp, vice-president.

P. E. Mertz, treasurer.

L. P. Pobst, secretary.

L. B. Murphy, assistant secretary.

The company advises that it will continue with the same progressive policies as in the past. The Williamson Heater Co. manufactures a complete line of warm air heating equipment, serving the trade from its foundry and factory at Cincinnati, Ohio, as well as from a number of conveniently located warehouse stocks.

Berger Bros. Now Manufacturing Rival Hanger Line

Announcement has just been made by Berger Bros. Co., 229 Arch Street, Philadelphia, Pa., that it has acquired the sole rights to manufacture the Rival eaves trough and O. G. hangers formerly manufactured by Finucane & Macfie, Inc., New York City. The company is now in a position to furnish these hangers from either its main office at Philadelphia or through its warehouses at 16th and Grove streets, Jersey City, and 140 South Dearborn Street, Chicago.

H. B. Huffaker Joins Dail Steel Products as Engineer

H. B. Huffaker, formerly for two years with the E. H. Ward & Company, has joined the Dail Steel Products Company as heating and ventilating engineer. Mr. Huffaker came from Omaha, Nebraska, where he had charge of the engineering division for one of the large furnace jobbers of that city. Prior to that time he was field engineer for the Cole Manufacturing Company of Chicago, covering Iowa, Nebraska, Wisconsin, Illinois, and Indiana. He has had a wide experience in heating and ventilating.

Through Mr. Huffaker's service, Dail Steel Products Company will be able to offer architects, dealers, home builders and home owners complete engineering service based on the most modern heating and ventilating methods.

Designing Heating and Ventilating Systems—Fuller

Scientific Book Corp., 15 East 26th St., New York City, are now selling the third revised and enlarged book on Heating and Ventilating by Charles A. Fuller.

This new edition gives a detailed explanation of the methods employed to determine the sizes and proportions of heating and ventilating equipment for all classes of buildings. It treats on the practical application of the engineering rules and formulas in a manner that can be readily understood and applied by those who have not had the advantage of higher technical training.

The book may be purchased either from the publisher or through the Book Department of AMERICAN ARTISAN.



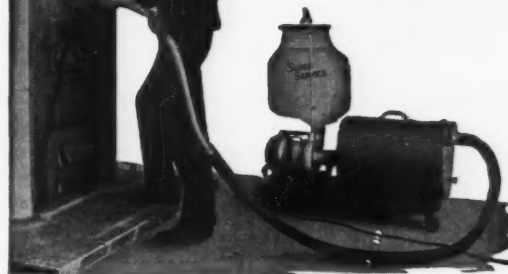
Our New Catalogue Is Ready for Distribution

It Is More Than a Catalogue—It Is a Buyers' Guide to

"Everything Needed in the Installation of Warm Air Furnaces."

Look through it carefully for its new features.

You Get More Than a Machine



This one-man outfit makes low overhead

WITH your Super Suction Cleaner goes a complete supply of direct advertising, all imprinted with your name, address and phone; also prospect cards. A well-rounded business and a Plan Book which makes it pay from the start. The first price covers it all.

Ask for list of users already making money.

Get this powerful motor, strong suction for rapid and thorough cleaning to save your time; separable, goes upstairs to clean registers but not to bump furniture; motor runs on both alternating and direct current, and does stay cool; SKF ball bearings, self-aligning; a definite guaranty of long endurance.

Get the metal separator which empties soot like a coal scuttle; the extra hose for long ducts; fifty feet of toughest rubber conductor; a complete set of tools to reach all places; everything included in the first price.

Ask for free trial for three days after arrival, and for your Plan Book telling how easy to sell more furnaces and repairs by cleaning furnaces profitably.

The Season Is On—It Will Not Wait

THE NATIONAL Super Service Company

1944 North 13th Street
TOLEDO, OHIO

Say you saw it in AMERICAN ARTISAN—Thank you!



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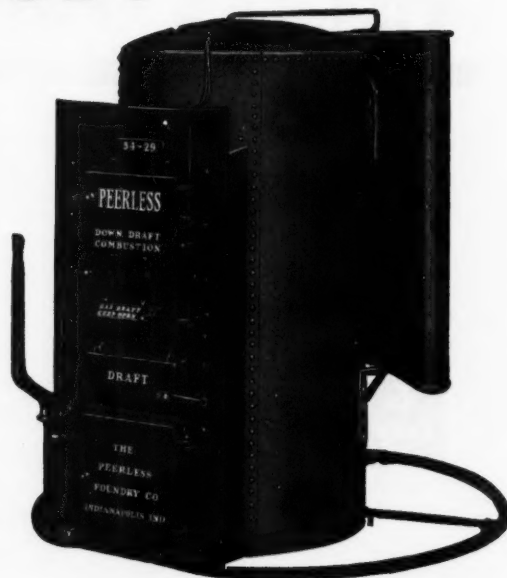
BUSINESS HAS BEEN
ON AN ECONOMIC
AND EMOTIONAL
SPREE

Manufacturers who have played with mass production and consolidation schemes, can now settle back to a period of meditation, remorse, and reflection. They will emerge sadder, saner, and wiser. But "never again" resolutions will not be soothing comfort.

You, Mr. Furnace Dealer, can rejoice with us if you sold high class warm air heating systems instead of the mass production jobs while the spree was on.

Peerless dealers made profits, and built a reputation for themselves as the outstanding heating men in their community.

You, too, can make good profits for 1931 if you hook up with a good old reliable company like Peerless.



Peerless Boiler Plate is only one of the Peerless built-in quality line. Of course, there is the Peerless Pleasant Home, a competitive priced steel furnace—and the Peerless built-in quality Cast Iron at a price that gets the business.

THE PEERLESS FOUNDRY COMPANY, Inc.

Pioneers in Warm Air Heating Since 1895

INDIANAPOLIS, INDIANA

Bailey Farrel Mfg. Co.
Warehouse Distributors
Pittsburgh Pa.

The Market Is Ripe for the Right Heat Control!



DEALER PRICE

\$27.00

Complete, including every necessary fitting and ball-bearing pulleys.

Sells for \$45.00 (plus installation) Particularly suited to coal-fired heaters of all types—warm air, hot water, steam.



RIGHT and left, people are becoming thoroughly educated to the healthful and economic benefits as well as the conveniences of automatic heat control—a situation on which you can capitalize to a surprising degree with the H & C if you will step on the gas. The price is modest—well within the means of practically every home owner. Yet in no sense is the H & C a cheap regulator. In both construction and efficiency it is the equal of the finest the market affords. It is wholly automatic, easy to install, *absolutely trouble-proof*—none of your profit goes back into servicing. Many dealers are pushing this item and making big money. Get your share! Act NOW—the market is ripe.

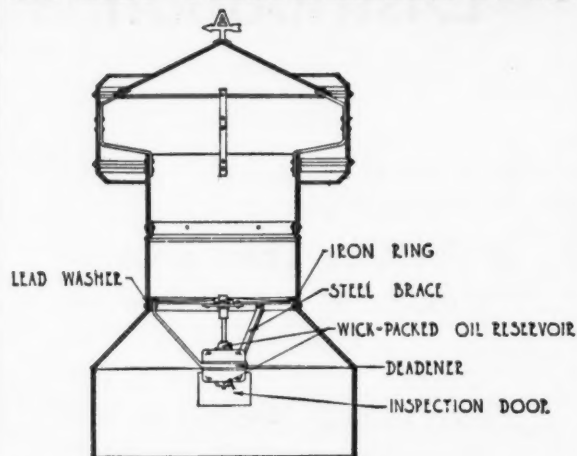
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MANUFACTURING
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JORDAN AERO VENTILATION

F-DIRECT CONNECTED-FAN VENTILATOR



A Unit for greater efficiency.
Combining gravity, ventilator and fan action.
Eliminating wind and weather hazard.

Backed by a complete engineering service

PAUL R. JORDAN & CO.

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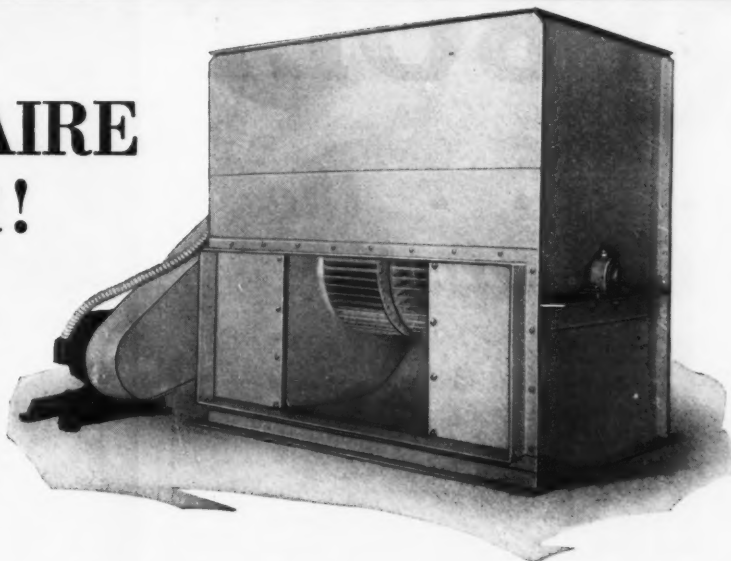
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Blower and filter combined in a single integral unit.

The Filtered-Aire Blower combines blower and filters in a single integral unit, compactly built. Converts any warm air heating system into a positive pressure system.

Dust-tight. Bearings outside the box. Four-speed adjustable pulleys. Quiet operation at all speeds. By-pass damper



for gravity operation on coal jobs. Easily installed at low cost.

Send for information on correct sizes for your furnaces. Inquiries solicited from furnace manufacturers, dealers and gas companies.

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is the title of this new selling help prepared by The American Brass Co. to help contractors secure more Anaconda Copper jobs. This folder, and others like it, are supplied free of charge and in reasonable quantities to contractors using Anaconda Copper—specially imprinted with their firm names and addresses. Write today for a supply. The American Brass Co., General Offices: Waterbury, Conn.

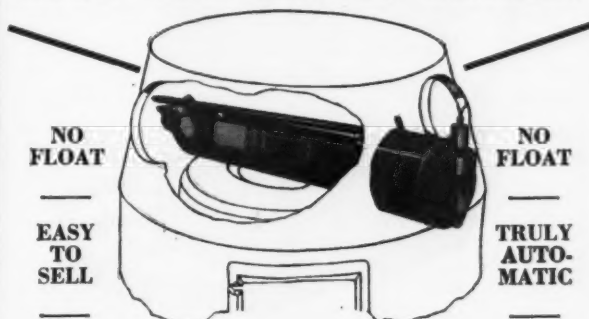
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SIMPLEX *Floatless—Automatic* **HUMIDIFIER**

A profit maker for you. Now being used on many furnaces as standard equipment.

LOOK—IT'S EASY TO INSTALL!



*Write for our dealer, jobber
or manufacturer proposition.*

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720 South 4th St., Minneapolis, Minn.

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... the Outstanding FURNACE VALUE

A high quality, dependable furnace, backed by over a quarter century manufacturing experience, and proved by thousands of satisfactory installations.

A greatly improved furnace, including an extra heavy, uniformly thick one-piece radiator with smoke and cleanout collars cast on, and many other advanced features found only in the finest heating systems.

A most attractive price, that enables you to profitably meet the stiffest competition.

These are reasons why, for years, the RYBOLT has been the *Big Seller* in the furnace field. Let us send you the complete details . . . write or wire for them NOW!

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BEST IN THE WORLD

"CHAMPION" Miters will
outlast the Eaves Trough. Gal-
vanized after formation. Com-
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For sale by all Jobbers.



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Furnace Cement You Have Always Wanted

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"FABRIKATED"

COLD AIR FACES

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Floor Registers

82%
OPEN
AREA

ANY SIZE . . . ANY FINISH

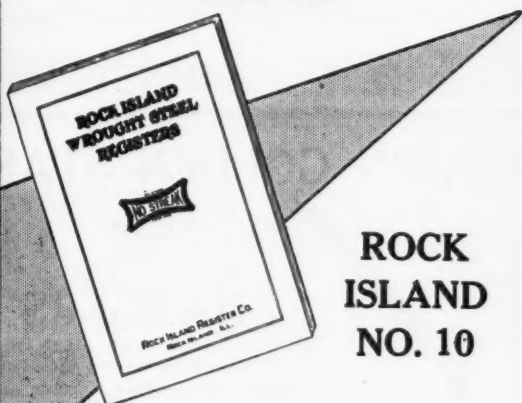
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**ROCK ISLAND
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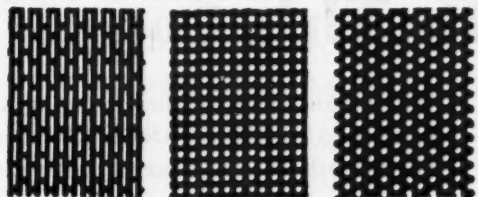


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In Steel, Zinc, Brass, Copper, Tinplate, etc.
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EVERYTHING IN PERFORATING METAL

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*Get acquainted with our su-
perior repair service NOW.
We furnish ORIGINAL re-
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**WRITE FOR
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ORDER BOOK** We have all the Patterns on
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A. G. BRAUER SUPPLY COMPANY
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NOW!

**PREMIER
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are guaranteed
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(Guarantee includes
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What better guarantee
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Please send:

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☐ The New Premier 1931 Price List.
☐ Both.

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It's Here . . .

The 1931 MELLOWFURNACE

"America's perfect heating unit"



Main sections extend through front.

Fitted with disc-ground doors.

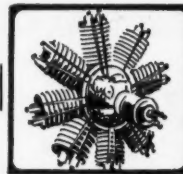
Hot blast smoke consumer is regular equipment.

DUPLEX GRATE

Many Other Superior Features

Write for the New Mellow Furnace Folder

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HEAT RADIATING FINNS

OSBORN GOLDEN STAR

SIZES
3½", 4", 5"
and 6"



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Made in our own plant from 16 Ga. Galvanized Steel or Ingot Iron—Also Copper and Brass—are practical—economical—and easy to install!
Let Us Send You a Sample



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DETROIT-CLEVELAND-BUFFALO
"Everything Used to Save Metal Work"



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for the cozy comfort of its appointments and the friendly spirit of its service, the Bismarck is Chicago's outstanding hotel for out-of-town visitors. Add to this its fame for Good Food . . . its most reasonable rates . . . its close proximity to all amusement and business centers . . . and you have the secret of The Bismarck's constantly growing popularity. Write for booklet with downtown map.

Rooms, \$2.50 up—With Bath, \$3.50 up

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BISMARCK
HOTEL CHICAGO
RANDOLPH AT LA SALLE

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When you have finished reading this issue of AMERICAN ARTISAN, pass it on to others in your organization, marking the articles in which they should be particularly interested.

Then file it for future reference. You never know when you will encounter a problem in your business that is covered in this very issue.

RYERSON

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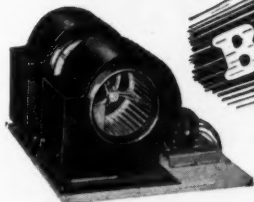
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Efficient, moderate-priced, economical of power, quiet. Provides for gravity circulation when not in operation.

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The AUTOMATIC DRIP HUMIDIFIER



Entirely Different
Write for Details

Correct and Controlled Humidity

THE Automatic Drip Humidifier is unlike all others. The amount of humidity desired is regulated. It is simple, fool-proof, durable, reliable and high grade in every respect.

For every warm air heating installation and especially desirable with oil heat because of control feature.

For efficiency and profits sell the Automatic Drip Humidifier—send for complete information today.

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"American Seal"

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Roof Cement—Stove Putty
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Capacity 10 gauge sheets
Any Length or Width
Flat Bars 3/16x2"
Weight 22 pounds

Price \$15.00 Net
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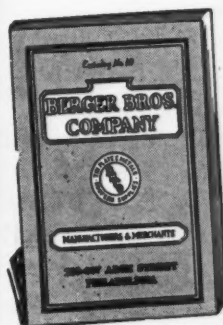
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(Sold by Leading Jobbers everywhere)

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The Lansing Furnace

Low Stack Temperature



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Economy

Makes the Lansing an ideal furnace for the live dealer.

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Dail Steel Products Company
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~ MARKET QUOTATIONS ~

AMERICAN ARTISAN is the only publication quoting Prices on Metals, Sheet Metal Equipment and Supplies, Warm Air Heating Supplies and Accessories, corrected bi-weekly. These quotations are not guaranteed but are obtained from reliable sources and reflect nation-wide market conditions at the time of going to press.

NOTE—These prices are Chicago Warehouse Prices to which must be added territory differentials

METALS

PIG IRON

Chicago Fdy., No. 2	\$17.50
Southern Fdy. No. 2	17.01
Lake Superior Charcoal	27.04
Malleable	17.50

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC 20x28 112 sheets	\$23.80
IX 20x28	27.45
IXX 20x28 56 sheets	14.95
IXXX 20x28	16.10
IXXXX 20x28	17.35

TERNE PLATES

	Per Box
IC 20x28, 40-lb. 112 sheets	\$23.50
IX 20x28, 40-lb. 112 sheets	26.00
IC 20x28, 25-lb. 112 sheets	20.05
IX 20x28, 25-lb. 112 sheets	22.90
IC 20x28, 20-lb. 112 sheets	18.55
IV 20x28, 20-lb. 112 sheets	21.35

"ARMCO" INGOT IRON PLATES

No. 8 ga.—110 lbs.	\$4.15
3/16 in.—100 lbs.	4.05
1/4 in.—100 lbs.	3.85

COKE PLATES

Cokes, 80 lbs., base, 20x28	\$12.00
Cokes, 90 lbs., base, 20x28	12.20
Cokes, 100 lbs., base, 20x28	13.75
Cokes, 107 lbs., base, IC, 20x28	12.75
Cokes, 135 lbs., base, IX, 20x28	14.75
Cokes, 165 lbs., base, 2X, 56 sheets	8.50
Cokes, 175 lbs., base, 3X, 56 sheets	9.35
Cokes, 195 lbs., base, 4X, 56 sheets	10.25

BLUE ANNEALED SHEETS

Base 10 ga.—per 100 lbs.	\$3.35
"Armco" 10 ga.—per 100 lbs.	4.15

ONE PASS COLD ROLLED BLACK

No. 18-20	per 100 lbs. \$3.55
No. 22	per 100 lbs. 3.70
No. 24	per 100 lbs. 3.75
No. 26	per 100 lbs. 3.85
No. 27	per 100 lbs. 3.90
No. 28	per 100 lbs. 4.00

GALVANIZED

No. 16	per 100 lbs. \$3.85
No. 18	per 100 lbs. 4.00
No. 20	per 100 lbs. 4.15
No. 22	per 100 lbs. 4.20
(Standard differentials on extras to apply)	
No. 24	per 100 lbs. \$4.35
No. 26	per 100 lbs. 4.60
No. 27	per 100 lbs. 4.70
No. 28	per 100 lbs. 4.85
"Armco" 24	per 100 lbs. 5.85

BAR SOLDER

Warranted 50-50	per 100 lbs. \$19.25
45-55	per 100 lbs. 17.00
48-52	per 100 lbs. 17.75
Plumbers'	per 100 lbs. 15.50

ZINC

In Slabs	\$5.00
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SHEET ZINC

Cask Lots (600 lbs.)	\$12.00
Sheet Lots (100 lbs.)	13.00

BRASS

Sheets, Chicago base	16% c
Tubing, brazed, Chicago base	24% c
Tubing, seamless, Chicago base	21% c
Wire, Chicago base	17% c
Rods, Chicago base	16% c

COPPER

Sheets, Chicago base	18%
Tubing seamless, Chicago base	21%
Wire, plain rd., 8 B. & S. Ga. and heavier	12% c

LEAD

American Pig	\$6.00
Bar	7.50

TIN

Bar Tin	per 100 lbs. \$33.00
Pig Tin	per 100 lbs. \$2.00

SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

ASBESTOS

Paper up to 1/16	5c per lb.
Roll board	5 1/2 c per lb.
Mill board 3/82 to 1/4	5 1/2 c per lb.
Corrugated paper (250 sq. ft. per roll)	\$4.00 per roll

ASBESTOS SEGMENTS

8 in.	per 25 sets \$1.85
9 in.	per 25 sets 2.10
10 in.	per 25 sets 2.35
12 in.	per 25 sets 2.65

CEMENT FURNACE

5-lb. cans, net	\$0.40
10-lb. cans, net	0.80
25-lb. cans, net	2.00
Per 100 lbs.	7.50

CLIPS

Damper	
No-Rivet Steel, with tail pieces, per gross	\$9.50
Rivet Steel, with tail pieces, per gross	7.50
Tail pieces, per gross	2.40

COPPER FOOTING

Copper Footing	45%
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CORNICE BRAKES

Chicago Steel Bending	
No. 1 to 6B	Net

CUT-OFFS

Gal. plain, round or cor. rd.	
26 gauge	30%
28 gauge	35%

DAMPERS

Yankee Warm Air	
7 inch, doz.	\$1.60
8 inch, doz.	2.20
9 inch, doz.	2.60
10 inch, doz.	2.80
12 inch, doz.	3.50
14 inch, doz.	5.00

EAVES TROUGH

Galv. Crimpedge, crated	75-15%
Zinc	60%

ELBOWS

Conductor Pipe	
Galv. plain or corrugated, round flat Crimp.	
28 gauge	60-10%
26 gauge	50%
24 gauge	15%

Galv. Terne Steel

Plain Rd. and Rd. Corr.	
28 gauge	60-10%
26 gauge	50%
24 gauge	15%

Square Corrugated

28 gauge	55%
26 gauge	40%

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested	70 & 5%
Nested solid	70 & 5%

Sq. Corr., A. & B. & Octagon

28 gauge	55%
26 gauge	40%

Portico

1. 1 1/4, 1 1/2 inch	45%
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Copper

16 oz. all designs	50%
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Zinc

All styles	60%
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ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue	
No. 28 Gauge, Doz.	
5 inch	\$1.15
6 inch	1.25
7 inch	1.75

Adjustable—Uniform Blue

No. 28 Gauge, Uniform Blue.	
5 inch	\$1.60
6 inch	1.75
7 inch	2.10

WOOD FACES—60% off list.

FIRE POTS

No. 02 Gasoline Torch, 1 qt.	5.18
No. 9250, Kerosene, or Gasoline Torch, 1 qt.	6.50
No. 10 Tinner's Furnace Square tank, 1 gal.	11.20
No. 15 Tinner's Furnace Round tank, 1 gal.	10.70
No. 21 Gas Soldering Furnace.	8.00
No. 110 Automatic Gas Soldering Furnace	10.50

GLASS

Single and Double Strength, A, all brackets	85%
Single and Double Strength, B, all brackets	87%

HANGERS

Conductor Pipe	
Milcor Perfection Wire	25%
Milcor Triplex Wire	10%

Eaves Trough

Steel (galv. after forming) from list	45%
Selflock E. T. Wire, List	10%

HOOKS

Conductor	
"Direct Drive" Wrought Iron for wood or brick	15%

MITRES

Galvanized Steel Mitres	
28 gauge	70-15%
26 gauge	70-5%

PASTE

Asbestos Dry Paste

200-lb. barrel	\$14.00
100-lb. barrel	7.50
50-lb. pail	4.25
25-lb. pail	2.15
10-lb. bag	1.00
5-lb. bag	0.50

PIPE

Galvanized	
Crated and nested (all gauges)	75-13 1/4%
Crated and not nested (all gauges)	75-7 1/4%

Furnace Pipe

Double Wall Pipe and Fittings	60%
Single Wall Pipe, Round Galvanized Pipe	60%
Galvanized and Tin Fittings	60%

Lead

Per 100 lbs.	\$12.50
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Stove Pipe

"Milcor" "Titelock" Uniform Blue	
28 gauge, 5 inch U. O. nested	\$10.00
28 gauge, 6 inch U. O. nested	11.00
28 gauge, 7 inch U. O. nested	13.00
30 gauge, 5 inch U. O. nested	9.25
30 gauge, 6 inch U. O. nested	10.00
30 gauge, 7 inch U. O. nested	12.00

T-Joint Made Up

6 inch, 28 ga.	per doz. \$3.40
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REGISTERS AND FACES

Floor Registers	
Steel and Semi-Steel	40 & 10%
All Cast Iron	20%

Baseboard

2-Piece	40 & 10%
1-Piece	40-10 & 20%

Adjustable Ventilators

Adjustable Ventilators	40 & 10%
------------------------	----------

COLD AIR FACES

Steel and Cast, less than 14" width	40 & 10%
Steel, 14" and wider	65 & 10%
Cast, 14" and wider	60 & 10%
Special Cold Air Faces, Steel or Cast	40 & 10%

RIDGE ROLL

Galv. Plain Ridge Roll, b'd'd	75-15-5%
Galv., Plain Ridge Roll, crated	75-15%

SCREWS

Sheet Metal	
7, 1/4 x 1/4, per gross	\$0.52
No. 10, 1/2 x 1/4, per gross	0.68
No. 14, 3/4 x 1/4, per gross	0.83

SHEARS, TINNERS' AND MACHINISTS'

Viking	\$22.00
--------	---------

Lennox Throatless

No. 18	35%
Shear blades	10%
(f. o. b. Marshalltown, Iowa.)	

SHOES

Galv. 28 Gauge, Plain or Corrugated, round flat crimp.	60-10%
26 gauge, round flat crimp.	50%
24 gauge, round flat crimp.	15%

SNIPS

Tinners'	Net
----------	-----

VENTILATORS

Standard	30 to 40%
Milcor	Net



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of All
Furnaces
Need
Cleaning

60
Per Cent
of All
Furnaces
Need
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You not only make a profit on the cleaning job but you are able to get into the basement and suggest repairs—and even sell new furnaces.

Protect and build your business with TORNADO Cleaning Service. It keeps customers satisfied and brings in new business. The TORNADO Furnace Cleaner is the lightest unit built—weighs only 30 pounds, a one man outfit—lowest in cost, only \$149.50 complete—powerful, oversized 2 1/2 H.P. G.E. Universal Motor mounted on Norma Precision Ball Bearings—10 gallon steel tank dust receptacle mounted on large castors, neatly polished aluminum lid and power unit—easily cleaned—just the cleaner to build profits at low cost. Write for complete information on our three days' free trial offer.

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Compound lever handle—removable blades. Upper blade away from mechanic enabling easy following of work—an exclusive Viking feature.

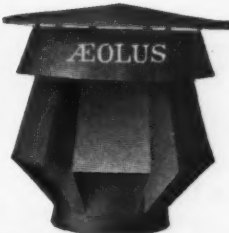


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(Continued on page 46)

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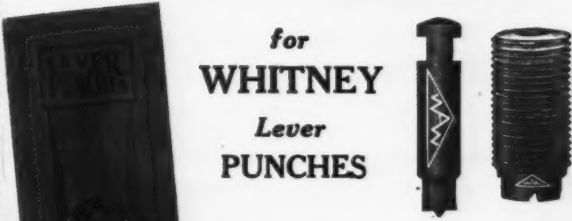
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 209-211 Fifth Street Aurora, Illinois

"D-Q" The MOST POWERFUL Suction Cleaner Made

THE extra power of the "D-Q" Cleaner makes it possible for you to do a **REAL CLEANING** job and to do it **QUICKER**. With the "D-Q" you can actually make the cleaning job itself pay you a profit.



It's light weight—made of highest grade cast aluminum—guaranteed against defective parts and it operates in any ordinary house lighting socket either A. C. or D. C. current from 110 to 125 volts.

Write today for our NEW four page folder which illustrates and describes the "D-Q" Super Suction Cleaner in detail.

DENSMORE-QUINLAN CO.
 KENOSHA WISCONSIN



Save you saw it in AMERICAN ARTISAN—Thank you!

BUYERS' DIRECTORY

(Continued from page 44)

Machinery—Culvert
Bertach & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Machinery—Rebuilt
Interstate Machinery Co., Chicago, Ill.

Machines—Tinsmith's
Bertach & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Rockford Sheet Steel Co., Rockford, Ill.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Yoder Co., The, Cleveland, O.

Metal Lath—Expanded
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Miters
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Nails—Hardened Masonry
Parker-Kalon Corp., New York, N. Y.

Oil Burners
Bettendorf Mfg. Co., Bettendorf, Iowa
Rock Oil Burner Co., Madison, Wis.
Mellvaine Burner Corp., Evanston, Ill.
Northern Oil Burners Inc., Minneapolis, Minn.
Silent Automatic Corp., Detroit, Mich.

Paint
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Perforated Metals
Chicago Perforating Co., Chicago
Harrington & King Perforating Co., Chicago, Ill.

Punches
Bertach & Co., Cambridge City, Ind.
Hyro Mfg. Co., New York
Interstate Machinery Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
W. A. Whitney Mfg. Co., Rockford, Ill.

Punches—Combination Bench and Hand
Hyro Mfg. Co., New York, N. Y.

Punches—Hand
Hyro Mfg. Co., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

Putty—Stove
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Radiator Cabinets
Hart & Cooley Co., New Britain, Conn.
Tuttle & Bailey Mfg. Co., New York

Registers—Warm Air
Auer Register Co., Cleveland, Ohio
Forest City Foundries Co., Cleveland, Ohio
Hart & Cooley Co., Holland, Mich.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Register & Mfg. Co., Cleveland, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Rock Island Register Co., Rock Island, Ill.
Symonds Register Co., St. Louis, Mo.
Tuttle & Bailey Mfg. Co., New York
United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Waterloo, Iowa

Registers—Wood
American Wood Register Co., Plymouth, Ind.
Auer Register Co., Cleveland, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Repairs—Stove and Furnace
Brauer Supply Co., A. G., St. Louis, Mo.

Ridging
Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Roofing Cement
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Roof Flashing
Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Roof Paints
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Roofing—Iron and Steel
Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Roofing—Tin and Terne
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Rubbish Burners
Hart & Cooley Co., Holland, Mich.

School—Sheet Metal Pattern Drafting
St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating
St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., 200 Varick St., New York

Screws—Hardened Self-Tapping, Sheet Metal
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., New York

Screens—Perforated Metal
Harrington & King Perforating Co., Chicago, Ill.

Scuppers
Aeolus Dickinson, Chicago, Ill.

Shears—Hand and Power
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa

Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Yoder Co., The, Cleveland, O.

Sheet Metal Screws—Hardened, Self-Tapping
Parker-Kalon Corp., New York

Sheets—Alloy
Inland Steel Co., Chicago, Ill.
International Nickel Co., New York, N. Y.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Aluminum
J. M. & L. A. Osborn Co., Cleveland, Ohio

Sheets—Black and Galvanized
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Copper
American Brass Co., Waterbury, Conn.
Revere Copper and Brass Inc., Rome, N. Y.

Sheets—Iron
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Copper Bearing Steel
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.

Sheets—Nickel
International Nickel Co., New York

Sheets—Pure Iron Copper Alloy
Newport Rolling Mill Co., Newport, Ky.

Sheets—Special Finish
Inland Steel Co., Chicago, Ill.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.

Shingles and Tiles—Metal
Globe Iron Roofing and Corrugating Co., Cincinnati, O.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Sky Lights
Globe Iron Roofing and Corrugating Co., Cincinnati, O.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Snips
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Snow Guards
Berger Bros. Co., Philadelphia, Pa.
David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Solder
Kester Solder Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Solder—Acid Core
Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Rosin Core
Kester Solder Co., Chicago, Ill.

Solder—Self-Fluxing
Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Soldering Furnaces
Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Specialties—Hardware
Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning
Fanner Mfg. Co., Cleveland, Ohio

Stove Pipes and Fittings
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Stove and Furnace Trimmings
Fanner Mfg. Co., Cleveland, Ohio

Strainers—Roof
David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Straps—Ornamental Pipe
David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Tinplate
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Tools—Tinsmith's
Bertach & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.

Torches
Diener Mfg. Co., G. W., Chicago, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Vacuum Cleaners—Furnace
Breuer Electric Mfg. Co., Chicago
Brillona Furnace Co., Brillona, Wis.
Densmore & Quinlan Co., Kenosha, Wis.
National Super Service Co., Toledo, Ohio
J. M. & L. A. Osborn Co., Cleveland, Ohio
B. F. Sturtevant Co., Boston, Mass.

Ventilators—Ceiling
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Reg. & Mfg. Co., Cleveland, Ohio

Ventilators—Floor
Aeolus Dickinson, Chicago, Ill.

Ventilators—Roof
Aeolus Dickinson, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Burt Mfg. Co., Akron, O.
Paul R. Jordan & Co., Indianapolis, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Wood Faces—Warm Air
Auer Register Co., Cleveland, Ohio
American Wood Register Co., Plymouth, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

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The CORRECT AIR MACHINE

for COOLING

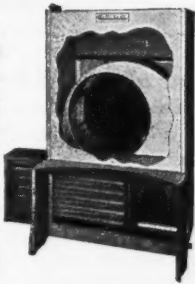
Do you realize that hundreds of dealers are making big profits selling blowers and fans on the basis of Home Cooling during the summer as well as Forced Heat in winter. They are, and "KORECTAIRE" is ideal for such sales. It is a positive blower—it humidifies the air and cleans it.

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The KORECTAIRE is the most quiet blower on the market—it is the easiest to install—it lends itself to any number of cold air returns. Ask for illustrated circulars and prices now.

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No. 60

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Furnished with or without attachment

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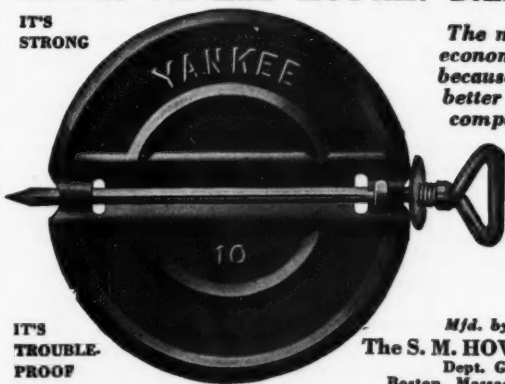
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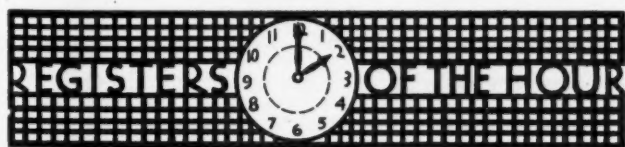
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The most economical because it's better and complete

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There is an AUER Register and Grille for every need—the Colonial, Aueristocrat, Economy, and Pro-Tex-Wall—but the catalog will tell you better. Write for it today.

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You can now heat with fresh air as economically as with recirculated air—and better.

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HEATING SYSTEM

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FOR that touch of refinement install AMERICAN WOOD REGISTERS. The wood register with a glowing history of over twenty-one years. Extra value without extra cost.

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PLYMOUTH INDIANA

Boost Profit with This Heat Booster



LET US TELL YOU HOW—

And Send You Our Catalog and Name of Nearest Jobber

A.-C. Mfg. Company, 417 Sherman St., Pontiac, Ill.



Gas FIRED Furnaces

The Rex with its tubular construction has more than twice the amount of radiation than many other furnaces. They are designed to burn gas economically and efficiently. The white arrows show the long fire travel to flue.

Write today for literature

CALKINS & PEARCE
205 E. Long St., Columbus, O.
"Gas Furnaces since 1893"



No. 290 Gas Furnace

Save you save it in AMERICAN ARTISAN—Thank you!

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Classified Advertising

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddle Company, Marshfield, Wis.

For Sale—A complete Hardware and Tin Shop in town of 3000 in best farming community in Ohio. Shop tools consist of 8 foot brake, 30 inch shear, and all other tools necessary. Will sell tools and store fixtures separately or all together. Stock reduced to around \$7,500. Address W-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

HELP WANTED

High grade furnace salesmen calling upon jobbing, sheet metal and furnace trade to handle a national line of Blowers and Air Conditioning equipment, as a full or part time occupation, on a commission basis. Address L-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

SITUATION WANTED

Manufacturers Representative

Desires to represent reputable manufacturers on Pacific Coast. Address C-538, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Illinois.

Situation Wanted—By experienced sheet metal worker. Can do roofing, furnace work, and general jobbing. Can furnish references on request. Address W. E. Benninger, c/o J. C. Weston, 53 S. Pearl Street, Youngstown, Ohio. X-537

Situation Wanted—By a competent tinner and plumber with 7 years experience. Can furnish best of references. Prefer Minnesota or Iowa. Address Y-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Situation Wanted—By experienced hardware clerk. Can also install furnaces, and do all kinds of sheet metal work. Prefer Wisconsin. Address General Sheet Metal Works, 523 Bridge Street, Wausau, Wisconsin. A-538

Situation Wanted—By sheet metal worker with 18 years journeyman experience in all general sheet metal work. Can lay out patterns and handle jobs all the way through. Can estimate, and sell jobs. Would consider a good shop on percentage. Prefer Illinois, Address P-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By first class steam fitter, sheet metal worker, and furnace man. Can make estimates and layouts on steam, forced air, or gravity jobs. Have had twenty years experience in selling and installation. Married. Strictly sober. Address D-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a tinner. City and country experience. Address J. H. Dennick, Juda, Wisconsin. A-537

SITUATION WANTED

Situation Wanted—By all around tinner, furnace and hardware man. Competent and experienced. References. Address J-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—Have been Superintendent of sheet metal shop for heating and ventilating company for eight years. Can make layouts, square casings, ducts and fittings for any residence forced air job. Address F. B. Howe, 31 West Home Street, Westerville, Ohio. Y-536

Situation Wanted—By general all around sheet metal worker. Prefer a jobbing shop. Thirty-eight years of age and married. Will go anywhere west of Chicago. Address Z-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By first class combination man. Middle Aged. Good salesman. Can handle shop if necessary. A-1 references. Can furnish all tools for heating and plumbing. Address K-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a strictly first class all around sheet metal worker with 25 years' experience. Can lay out patterns, read blueprints and handle any kind of a job that may come to any sheet metal shop. Address Edward H. Collins, 417 Jones Street, Clearwater, Florida. L-537

Situation Wanted—By first class tinner and furnace man. Good all around man on gutters and sheet metal work. Steady and reliable. Married, no children. Reasonable wages for steady work. Address D-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By first class sheet metal worker, plumber, and furnace man with 25 years experience. Married, sober, steady and reliable. Best of references. Address F-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

SITUATION WANTED

Situation Wanted—A first class sheet metal worker and furnace man will give four weeks labor for Board to show his ability to handle the job. Address G-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Situation Wanted—Have had 26 years experience in the sheet metal and furnace business. Can figure all sizes of work, forced air, gravity, and ventilation. Have knowledge of engineering warm air heating, layouts, pattern cutting, can make own plans, and will go anywhere. Prefer New York, Illinois or Pennsylvania. Am 41 years old, married, three children, steady and reliable. Address H-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a first class hardware clerk and salesman. Also good mechanic in shop if needed. Would like to make a change. If you are in need of a capable and dependable man, answer this ad. Address J-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—Position as credit and sales manager, or would consider road job. Age 50, 25 years experience in credits and salesmanship. Would like to correspond with legitimate firm needing such help where the future would be open for a small investment. Address R-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a first class plumber and sheet metal worker. Prefer town or small city in southern New York or northern Pennsylvania. Can do anything under these trades, new or repair work. Can furnish best of references from employer and customers. Address T-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

MISCELLANEOUS

Wanted—Equipment for manufacturing metal culverts. Must be in good condition and reasonable. Address Sam H. Kerr, Lufkin, Texas. C-537



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"We could make \$50 to \$500 additional each month in the year with a more perfect knowledge of Plans, Layouts, Estimating and Technical Research. Many is the job I turn down because of the 'fear' to tackle it," writes the son of a Shop Owner. THE ST. LOUIS TECHNICAL INSTITUTE offers this very kind of specialized Training at a very moderate cost to Employers, their sons, Engineers, Estimators, Salesmen, Foremen, Mechanics, etc. We have wonderful Programs of Training to fit your very needs; well illustrated with drawings; well explained to be understood and applied in a practical way. We Teach You in your own Home, Personal, Clear, Direct. Entire satisfaction is guaranteed. Full information is free, check your Course—write today.

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- ☐ Specialized Short Sheet Metal Courses.
- ☐ Heating Ventilating Engineering.

- ☐ Special Warm Air and Forced Air Heating.
- ☐ Air Conditioning for Fan H. & V. Eng.
- ☐ Contracting and Estimating.

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"CASH IN" on your OLD MACHINERY

Is Your MACHINERY Awkward, Out-of-Date or Unused? Don't Let It Stand Idle—"TRADE IT IN."

We Carry America's Largest Stock Modern Machinery at Prices That Will Suit Your Bank Book.

750
Machines to Choose From
Send Us Your Inquiries

2 Machines Hard to Find
6 Ft. $\frac{3}{8}$ Bending Roll.....\$500
60" 10 ga. Ring and Circle
Shear 450

INTERSTATE

MACHINERY COMPANY
130 S. CLINTON ST. CHICAGO

Say you saw it in AMERICAN ARTISAN—Thank you!

NOW! An Exclusive Dealer Franchise!



Effective immediately, the U. S. Furnace will be distributed through one big live dealer in each city.

This is the first time in the history of the United States Furnace Company that this high-grade furnace will be sold through dealer organizations. It's an opportunity which will be welcomed by live dealers everywhere. It will pay you well to investigate.

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DOUBLE JOINTS—NO BOLTS—NO CEMENT

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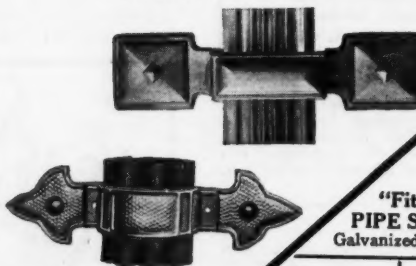
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June 8, 1933

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"Weather Control"



All in One Unit

Automatic Forced Air Oil-Burning
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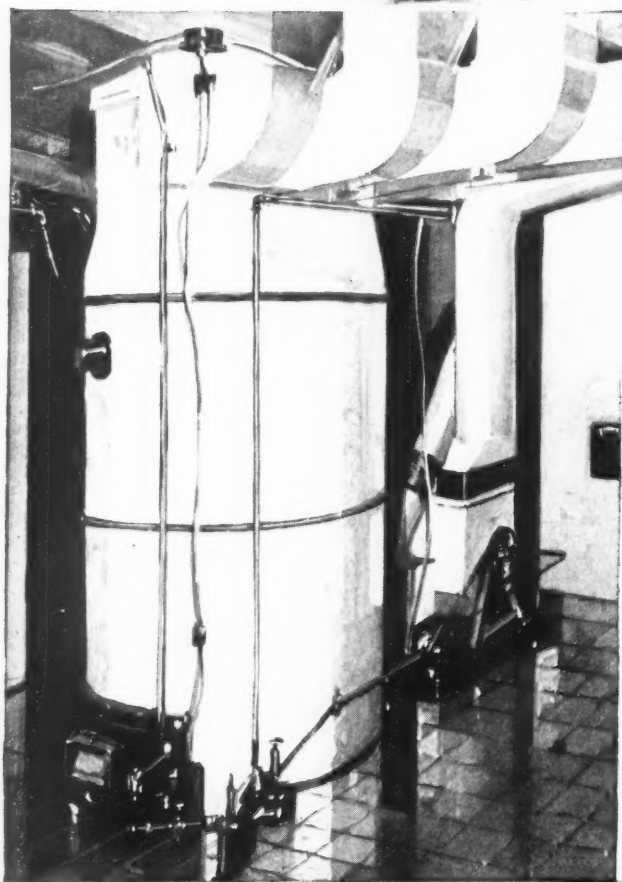
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Point 5

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